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Section on Pharmacopoeias and Formularies

Papers Presented at the Sixty-Second Annual Convention

MINUTES OF SECTION

The first session was called to order promptly at 9:30 a. m. on Wednesday, August 26, at the Hotel Pontchartrain by Chairman Cook, who in opening the meeting referred to the unavoidable absence of the Secretary, Prof. Needham, on account of sickness in his family, and stated that he had requested Mr. Thum of Philadelphia to act as Secretary *pro tempore*.

The Chairman then delivered his address [printed in September, 1914, issue] and on motion of Prof. Remington it was referred for publication.

The Secretary's report was read and, on motion, it was accepted and placed on file.

Chairman Cook then read the following letter from Dr. Nestor Tirard, the Medical Editor of the British Pharmacopœia:—

74 HARLEY STREET, W., LONDON, ENGLAND, August 8th, 1914.

E. Fullerton Cook, Esq., Chairman Section on Pharmacopoeias and Formularies, American Pharmaceutical Association.

Dear Sir: In answer to your letter of July 7th, relating to the British Pharmacopœia, as it was not in my power to send you an advance copy I had hoped to forward you a brief review of the new issue. Now I have to inform you with regret that owing to the grave inconvenience which might result from the introduction of a new standard at the present time, it has been decided to postpone publication.

Very truly yours,

NESTOR TIRARD,
Medical Editor of the B. P.

Prof. Remington then addressed the Section upon the subject of the Pharmacopœia IX, saying:—

"Mr. Chairman, I do not think it is necessary to present a report at this time in detail of the Pharmacopœia. It is very remarkable that the British Pharmacopœia revision, which has

been coincident to that of our own Pharmacopœia, should have progressed up to the present time.

"I was in London a year ago and Dr. Tirard invited me to meet him—who might be called the Chairman of the Committee on the revision of the British Pharmacopœia. He called me in to see the new British Pharmacopœia. The new features in it are very few. It seems so strange when I think of a year ago and being with Dr. Tirard. I looked at the modest office. It was something like our own pharmacopœia. One had to stop and think a few moments and make a few comparisons.

"I will tell you what has been done, and I think it is of far more importance than it apparently seems. The British Pharmacopœia and the United States Pharmacopœia get together on one practical idea which affects the doctor and the pharmacist equally, and that is to have a table of abbreviations for everything. Abbreviations! Now what do we mean by that? I think you all must realize that in the reading of prescriptions we do not know sometimes, as we read a prescription, what the doctor means. Abbreviations are the real language of prescriptions. No doctor in the world ever writes out now in full a prescription either in Latin or in any other language, particularly in Latin, with all the terminations, correctly. They say life is too short to do that. Every doctor abbreviates. Then why not have a standard and let 'pot. iod.' stand for potassium iodide, and 'sod. brom.' stand for sodium bromide. Now we want to make uniform throughout the English speaking countries this system of abbreviations. In other words, prescription language we want to get together on, and have uniform. It is going to take time. An English pharmacist reading a prescription of an American physician when travelling, will know just exactly what he means and the abbreviation can mean nothing else when it is once established. Nothing of this kind has ever been done before making uniform these abbreviations. The idea, as I developed it to Dr. Tirard, took some little time. He said, 'That is one of the most desirable things we can have.' Then I called his attention to the fact that we can also use these abbreviations for shop furniture. Take, for instance, the question of the relief-clerk; a relief-clerk going to another store is confronted with different abbreviations. Potass bromid,—that is very easy,—potassium bromide, and so on. There is no uniformity now. The manufacturers of labels have their own abbreviations. Each manufacturer of these glass labels has his own idea of how these things should be abbreviated. It is a little practical matter that has not been systemized and brought into line. Here is a little thing that science is getting into, the little matter of abbreviation of the words that are going to be used. We are going to have an abbreviation for any item a physician prescribes, if the doctors still continue to write prescriptions, although I am sometimes doubtful if they will. But never mind; the drug business will survive nevertheless, but we do want to see when we go into stores, a uniformity in the language that is used in designating any articles which are used in medicine.

"I will now come back to the actual work of the pharmacopœia. A very important part of the book which is usually neglected by the pharmacist and the physician. The tables,—you are familiar with them, no doubt,—in the back part of the book, the part called the appendix. This appendix is really the most important part of the book because that is the standard for standardizing the standards; volumetric solutions, tests, and the tables,—everything which is there is really the most important part of the book, because they are the standards which regulate the standards. The front part of the book and the text part of the book are the only parts you are interested in. It has what you want, paregoric, and syrup of squill and other good things you want. But in order to start the work, that it may go on systematically, the committee must have the standards upon which they base their work before them all the time, so we begin at the end of the book; that is, we begin with the appendix and get at all the mistakes that are in that appendix, and then when that is done, the completed appendix, upon which the rest of the book depends, is in the hands of everybody. That part of the book is in the hands of the printer, and I hope in two weeks we will be able to send that out, so it will form the basis for the work.

"We have heard a good deal about the binding of the book. One man has written a letter with regard to binding the book, in which he says the book is all falling to pieces. Well, I asked him how long he had had it. He said he had had it twelve years. I said, 'What use did you put it to?' He said, 'Oh, my pharmacopœia is in use all the time. I have it on my prescription counter.' I said, 'Has it been dusted with permanganate and nitric acid once in a while? Didn't the boys drop it on the floor twice a day on an average?' He said it was a good deal that way. A Pharmacopœia twelve years in use, with that kind of treatment, and yet it is beginning to fall to pieces. I said, 'You would begin to fall to pieces too if you had been knocked about that way for twelve years.'

We are going to tie it together with four bands. These bands are glued on with glue which has passed inspection and is free from germs and absolutely aseptic. It is to come in around each one of those and to be glued down that on the side (illustrating). The committee hope, if the book is thrown on the floor, on one corner, that the other three bands will hold; that if it don't hold on that corner, then the other three bands will hold it together.

"This idea about the pharmacopœia not being well bound! Why, the book is one of the best bound that has ever been put forth. This criticism is only from people that are hypercritical. I can show you plenty of books that do not get half the use that the pharmacopœia does that have all gone to pieces.

"But I will tell you one thing about the binding that is of concern to you; the worst kind of binding now for anybody to buy for any kind of book is sheep. Sheep binding will not stand because we do not get the leather we used to. The process that is used for tanning will cause it to weaken sometimes inside of a year; at least it becomes tender.

"Now look at this book; solid and unyielding. Where does the strain come? Just on that little bit of a crack, hardly a line in length. The whole thing depends upon that little hinge. I sincerely hope and believe, if we do not have a war, that our pharmacopœia will be out after all within a reasonable time. I think in six months we can see it through the press and get it out. But here! There is the dummy; there is the book only for size; don't look inside because it is all mixed up purposely, but there is the style of binding that I hope you will buy for your own good. It is not made of leather; it is called buckram; that is a cloth especially made, far more durable than sheep and at half the price. This will be on account of the binding, intermediate in price; between the sheep and the cloth. I will pass that around and let you look at it. That is the dummy; it has been adopted merely to show the size of the book and the printing on the outside, and the binding, but I think that binding will outlast two sheep copies anyhow, and, of course, there is the cloth copy (indicating); the printing will be different; the outside will be different. It has been approved by the Board of Trustees and that will be the outward appearance of the new book. This printing will probably be different, so as readily to distinguish one from the other. That will be the color of the buckram, and this will be the color of the cloth. The blue will be the cheaper of the two, and we will have the sheep for those who want it. Now the committee has tried, and it is going to keep on trying to satisfy everyone and every suggestion that has been made on the pharmacopœia we would like to consider, but that is not always possible.

"Now there are two other things,—there may be three; one is the whiskey question, whether it is to be taken up by the pharmacopœia or whether it is not, and I cannot tell you yet what the decision will be. But the decision is growing among a great number of the members of the Association to drop whiskey and brandy from the pharmacopœia entirely and not involve the pharmacopœia in any litigation in the future; drop it entirely. And I think Dr. Wiley is probably quite willing to do that. He has been the great champion of pure foods and pure drugs, but for my own part, I do not hesitate to tell every body what my own opinion is as Chairman of the Revision Committee; I think it was a mistake to put whiskey and brandy into the pharmacopœia Eighth Revision.

"I do feel very greatly relieved, and we must all feel relieved at the prospect of getting out that book. And the people who have been crying about the pharmacopœia all this time do not realize that they will not be the happiest bunch when that book comes out, but the happiest bunch will be the members of the committee and the poor chairman who has been the punching-bag for everybody, but who can then lie down and get a good sleep and get up and eat a good breakfast.

"I haven't anything to say with regard to the book itself because it will be so soon in your own hands that you can see for yourselves. I am only bringing to you here a part of the make-up of the pharmacopœia and to tell you the condition of the revision at the present time.

"The only other question is which of the two organic assays which have been proposed will be accepted, and as to that matter, I am going to have a meeting with Dr. Rosengarten, who is the Chairman of the committee of chemicals and organic chemicals. I met Professor LaWall who was to have been here, but Mrs. LaWall met with an accident and broke her arm and he is compelled to remain in Philadelphia with his wife. We have Mr. Raubenheimer and Dr. Lyons, who is with us at this meeting—God bless him—is one of the committee. Now he was very ill, and he is the man that has given us those tables. He is the mathematician of this committee. I believe Dr. Lyons lives, eats and drinks figures, and I could not be surprised when he gets up in the morning some of these hot days if there is not an imprint of the pharmacopœia on his pillow. But never mind all this; I want to thank him and every other member of the committee. The bow is unstrung and we are so nearly through that I can indulge for the first time in the last five years in some happy thoughts.

"There are other members of the committee here who want to say something, and I am taking the time, but I do hope sincerely that we will have no such set-back as that of the British Pharmacopœia. I hope you who are gathered here to hear about the pharmacopœia will share the attitude and the feelings of the Revision Committee.

"There have been some differences in some of the committees. The members differed and squabbled and fought and lost their temper once in a while. But I know them all. When anybody says anything nasty about anybody else, it goes in the waste-basket, because I won't print anything that is derogatory, or which reflects upon any member of the committee. Some things have not been published, but you can easily see if the doors are open to let in personal feeling and personal views it would not be a valuable book. It is not gotten up to express anybody's personal view, but if in the course of time the members have any difficulty, we have got to straighten it out. We must have harmony and coöperation or we could not get along. We have had it and we are nearly through, and I do not think there is any liability of any very big trouble. We have been very strenuous about expressing our opinions, but after all, I think we will have a pharmacopœia that will meet with the approval of nearly everybody." (Applause.)

CHAIRMAN COOK:—"I am sure we have been very much enlightened by this informal and interesting report of the Chairman of the Revision Committee. It will now be in order to hear any discussion on this question of pharmacopœia. All questions that anyone wishes to ask, no doubt the Chairman of the Committee will be glad to answer or explain any point."

PRESIDENT BERINGER:—"I do not think the druggists or many of the critics have any idea at all of the volume of work that has been necessary in making up the standards that go to make up the pharmacopœia. I find difficulty in reading them all, and I guess most of the members do."

MR. THURSTON:—"I would like to ask Prof. Remington a question. In the old pharmacopœia we had a number that was pasted in,—an official number for each copy. I would like to know if some method could not be devised to publish an official certificate in each copy so that it would be taken as authority in cases at law. I have had cases where they would question the pharmacopœia. For instance, they would say, 'How do you know that is the Pharmacopœia of the United States?' Well, I wasn't on the committee to prepare the pharmacopœia; I didn't help write it, and there was no way for me to swear that that was absolutely the Pharmacopœia of the United States. There should be some method, if possible, so that in cases of that nature that we could prove that the book that we testified to was the Pharmacopœia of the United States."

PROF. REMINGTON:—"I certainly appreciate the remark by my friend Prof. Thurston, and this is what he refers to, I think; this is the old pharmacopœia,—that little label there; that coupon we call it; that little coupon there on that page. Now, that was never gotten up with the idea of proving the identity of the pharmacopœia, but that idea originated with Dr. Charles Rice in the previous pharmacopœia, of pasting a coupon in the book which simply read 'The Pharmacopœia of the United States of America; official copy,' and then it is numbered serially, and they are all taken up in issues. For instance, there is 'A,' meaning 20,000 copies of the pharmacopœia, ordered first; Series B, meaning the next 10,000, or Series C, the next 10,000, or 5,000, as the demand tapered off. There was one published, and I will say that the same publisher will publish the new pharmacopœia that published the last. These coupons are used between the printer and the publisher so that the coupons here were furnished at the last revision and now they will be furnished by a Board of Trustees. The Secretary, Mr. Whelpley, will furnish the coupons for this edition, and he has charge of those. He issues 20,000; he sends to the publishers 20,000 and they send 20,000 to the printer to paste in the book at the time that issue goes out, and they are all numbered from one to 20,000. Now when Series B comes, then it will be the second issue.

"As to the point of Prof. Thurston, I do not see how the use of a label or the use of anything in the book itself would be regarded as evidence that it really was the pharmacopœia, if a man wanted to cheat,—if he wanted to get up something to imitate the pharmacopœia, or leave something out, or put something in, and the lawyer wants to know if that is really the pharmacopœia."

MR. HOSTMANN:—"That question was raised in New Jersey some years ago in a suit in one of the lower courts. The lawyer wanted evidence that that was a copy of the pharmacopœia. The Judge was about ready to throw the case out. Then there was an agreement made between the two attorneys, and the court decided that the only way that that book could be admitted as evidence was to secure an attested copy from the Library in Washington,—I believe it is the Library,—the Congressional Library of the United States, and the State's attorney went to Washington, and there they produced a copy of the pharmacopœia and it was endorsed on the inside on the second page 'Registered in the office of the Librarian of Congress at Washington.' There was an official seal there and the Librarian's signature that that was a true copy of the United States Pharmacopœia. That was only in the lower courts there, but I believe that is the regular procedure if you want to use the book as testimony you will have to have it attested by the Librarian at Washington, that it is a true copy of the book. I imagine that is the only way it can be done."

MR. RAUBENHEIMER:—"I can see it will be an immense benefit and it will certainly increase the weight of the pharmacopœia in court if the statement was made on the title page that this book has been made the legal standard of the United States. I think such a statement would certainly have some weight in court; not only in court, but it will have weight in the other service. I believe there are still some men scattered throughout the country, perhaps in New York, perhaps in this city, that don't know the U. S. P. and the N. F. has been made the legal standard. I believe that would be a pretty good idea. It might also increase the weight by having perhaps the stars and stripes or an American eagle or something like that on the outside. It would impress probably the public as well as the pharmacists, and even the lawyers."

The report of the Committee on the U. S. P. was read by Prof. L. D. Havenhill. [Printed in September issue.]

CHAIRMAN COOK:—"I would suggest that as the Pharmacopœial Revision Committee are going to have a meeting this afternoon, that a motion be made for the receiving of this paper and that it be referred to that committee for consideration." It was so ordered.

PROF. REMINGTON:—"I just want to say a word. There was a point brought up by Mr. Havenhill about expensive apparatus. The committee have considered the matter very carefully. For instance, on electrolytic methods, which cannot be performed by the pharmacist;

the committee realizes that this book now is the standard for the United States; it is the standard under the food and drugs act, and anything like dropping from the pharmacopœia a decisive and valuable test like the electrolytic test, and give it up because the clerks in the drug stores cannot get the apparatus, or because the students in the colleges cannot use it, is not to be considered. We cannot afford, with a book that is authority for the United States, to consider that all we have got to think about is the student. The pharmacopœia was not made and is not made for the student. It is not its function either to cater to the retail druggist. It is, though, the prime object that the test shall be as simple as possible; and the pharmacopœia cannot be limited in scope, now that it is the standard for the United States, to the non-education of some clerk in a drug store.

CHAIRMAN COOK:—"The next order of business is the report by Prof. C. Lewis Diehl, of the National Formulary Committee."

REPORT OF THE COMMITTEE ON NATIONAL FORMULARY.

C. LEWIS DIEHL, CHAIRMAN.

The efforts of the National Formulary Committee throughout the year have been chiefly directed toward the perfection of the final text. This has been reproduced as edited copy in the Committee Bulletins, and has included the majority of articles proposed for Part II, which have been prepared by the Committee on Unofficial Standards.

A set of formulas and articles proposed for the book have also been prepared in manuscript form so that Part I (formulas) and most of Part II (drugs or chemicals) are practically in readiness to turn over to the printer when the contract is awarded.

A conference of the Committee has been called, to extend over possibly two days, following this meeting of the Association, and it is expected that the final manuscript will be perfected at that time.

As bids have already been received by the Committee on Publication for the printing and binding of the book and the contract will no doubt be awarded by the Council before the close of this meeting, it can be confidently expected that the National Formulary, Fourth Edition, will make its appearance within the next six months and certainly not later than the appearance of the U. S. P.

On motion it was referred for publication.

CHAIRMAN COOK:—"The next report is one by Mr. George M. Beringer, Chairman of the Committee on Unofficial Standards. [Printed in November issue]. You have heard this report. If there is no objection it will take the usual course."

MR. HYNSON:—"May I ask if you, in including all this work in the National Formulary, regard it as the proper place for it?"

MR. BERINGER:—"It seems to me in answer to that inquiry, Mr. Hynson, that it is absolutely necessary to protect the National Formulary as a legal standard; that it should include proper tests and define its standards and its formulas. We have always believed they were there, but they are not there. It is up to us to supply them. We have discussed it back and forth in the committee and we have all come to see the necessity of its being there.

"The Food and Drugs Act says The National Formulary. You cannot amend the food and drugs act of the nation and the food and drugs act of the various states by simply changing the name; you must retain the title of your book."

MR. HYNSON:—"I meant as a supplemental title."

MR. BERINGER:—"The main title of the National Formulary must remain."

MR. RAUBENHEIMER:—"In a way I believe Dr. Hynson is right. A National Formulary, as such, must retain the present title inasmuch as the pure food and drugs law simply states the standard in the U. S. P. and the N. F., and so on. In time, I have no doubt, this committee on standards will standardize all things."

MR. HYNSON:—"The idea is brought out by Mr. Raubenheimer. I would like to say, after a great deal of thought and consideration—I have to think over things very hard and very long to get a good understanding of them—that I don't know any work that the American Pharmaceutical Association has done that is so creditable and is so much in use, and that

there is so much promise in it as there is in this work. I believe it is the beginning of the most stupendous work of the American Pharmacist. Everything changes and I think the day will come when we will see a book of standards which will be the outgrowth of this work and will far exceed in importance the United States Pharmacopœia. I want to say, however, that that belief is simply a personal belief, but I do believe it will not be two decades before the physicians of this country will entirely ignore the United States Pharmacopœia.

"I want to say a word in appreciation of this work; that I believe it is of such a character and a work that has required so much care and attention that it ought to be brought out distinctly; let it be known that the National Formulary, beside being a book of formulas is a book of standards. I do not believe that that can be done well except by making a supplemental title, if that be legal. But I want to set forth my appreciation of the work and my belief that we hardly know what has been begun in this direction."

MR. BERINGER:—"I would like to call the attention of the Association to the fact that a great deal of the work which the Committee has actually done has been up-hill work. Much of the work the committee did became valuable to the Pharmacopœia and I believe it is indeed a very happy condition that we have had such coöperation on the part of the different committees."

MR. KIRCHGESSNER:—"Do I understand, Mr. Hynson, that we are to have a supplemental book before it goes into the National Formulary?"

MR. HYNSON:—"No, I did not mean that, because we have to retain the legal character of it, but I would like to see it, as far as possible, brought out that there are things in the book that are not standard and a great many that are standard."

Mr. Hynson, Chairman of the Recipe Committee, read the report of that Committee. [Printed in September.]

MR. ENGLEHARDT:—"I move that this very excellent report be received and the recommendations contained therein be referred to the Chairman."

Motion seconded and carried.

CHAIRMAN COOK:—"It will be received and the recommendations referred to the Council for action.

"We have about ten minutes at this point for discussion of this paper. It is an excellent report and an ideal condition that we hope will develop."

MR. RAUBENHEIMER:—"There is no doubt in my mind that Chairman Hynson has given this subject much more thought than perhaps any of us. I hope he will remain the Chairman of that committee, because he understands it much better than I do. In time, he will convince all of us that he has the proper idea of what the ideal recipe book should be, and no doubt it will be of great benefit if such a book is published only in part, as a supplement to the journal. We have too many books of formulas, but we have no reliable ones. It is necessary and it is the duty of the A. Ph. A. to take the initiative step to bring about such a book of which Prof. Hynson is the father."

MR. BLAKESLEE:—"I just want to say a word on this subject, a fact that Mr. Hynson or perhaps others have not considered. I observe in every section of the country the attitude of the retail druggist in regard to their desire for information such as Prof. Hynson proposes, and it is alarming to see what a demand there is for reliable formulas; how at sea the retail druggists are for information of that kind. There is a class of formulas that could be recommended by intelligent pharmacists, such as Mr. Raubenheimer and Mr. Hynson, and others; therefore it would be a clearing-house for certain large manufacturers. I am sure it would be a source of great value to them if some such publication of that kind were brought out, and I hope Mr. Hynson will never let up until he gets his idea in some sort of tangible form."

A paper by Dr. Bernard Fantus entitled, "Can the U. S. P. and N. F. be Made Popular With Physicians?" was read and referred for publication. [Printed in this issue.] Adjourned until Friday, August 28.

SECOND SESSION, FRIDAY, AUGUST 28, 1914.

The meeting was called to order by Chairman Cook at 9:30 a. m.

PROF. RAUBENHEIMER:—I move that the reading of the minutes be dispensed with.

Motion seconded and carried.

CHAIRMAN COOK:—The first subject on the program is a review of the Norwegian Pharmacopœia, by Dr. M. I. Wilbert.

THE NORWEGIAN PHARMACOPŒIA.

M. I. WILBERT, PH. M.

The fourth edition of the Norwegian Pharmacopœia, or as it is officially known "Pharmacopœa Norvegica, 1913," became official on January 1, 1914, replacing the former third edition of the book which was published in 1895.

The new pharmacopœia consists of a total of XIII and 467 printed octavo pages, 362 of which are given over to the description of official drugs and preparations. The official monographs include 543 titles, of which number 17 are general headings, 149 are drugs, including 15 of animal origin, 169 are chemical substances and 208 pharmaceutical preparations.

The prefatory pages include the royal proclamation of February 7, 1913, announcing the publication of the book and the date on which it is to become official, a review of the contents, a short prefatory note by the members of the commission in charge of the revision and the outline of general methods for determining physical and chemical constants. These general methods include directions for the determination of temperature, specific gravity, solubility, melting point, boiling point, polarization, iodine number, acid number, ester number and other constants. This portion of the book also briefly outlines the methods to be followed in collecting and preserving plant drugs.

The text of the pharmacopœia is printed in Norwegian and only the titles of the several articles are in Latin. In compliance with an existing agreement these Latin titles are similar to those in the other Scandinavian countries, Sweden and Denmark, and are generally quite distinct from the titles appearing in the pharmacopœias of other European countries; the older Berzelian method of giving preference to the acid radical in connection with chemical substances being generally followed.

The monographs for drugs, particularly drugs of vegetable origin, are concise and clear and the same can be said of the monographs for chemical substances. In connection with the latter class of articles the chemical formula and also the atomic weight where reasonably available is usually given. This is modified somewhat in the case of acids and other solutions to indicate that those substances are more or less variable. Hydrochloric acid, for instance, is given HCl.Aq. with the requirement; 100 parts contain 25 parts of hydrogen chloride (HCl=36.47).

In common with the pharmacopœias of the two other Scandinavian countries this book includes what may be characterized as a pharmacopœial joke. Under the heading "Glacies" and the Scandinavian "Is," the equivalent of the English "Ice," is a blank space evidently intimating that any attempt to describe the substance would be useless.

As an illustration of the recognition that has been accorded to newer researches, more particularly the possible influence of enzymes on the activity of plant drugs, it will suffice to call attention to the requirements for digitalis leaf. This drug is to be collected from the indigenous, wild growing plant at the time of flowering, is to be dried for at least five hours at about 80° and preserved in small, well-closed containers holding about 50 gms. of the drug.

The Norwegian Pharmacopœia has, of course, been liberally discussed in European countries and differences of opinion have been evidenced particularly in regard to the scientific character of the book. A writer in the Chemist and Druggist, London, for instance, expresses the opinion that "The book is not a particularly up to date publication," while the reviewer in the Lancet opines that "The new work embodies many features of modern research in pharmacy and testifies to the high scientific attainment of Norwegian pharmacists." The German reviewers generally find much to commend in the book, largely perhaps, because it is considered to be distinctly in keeping with the German pharmacopœia. The descriptions of crude drugs and of chemicals are generally commended, and Schimmel & Co., in their Semi-Annual Report for October, 1913, express the opinion that the requirements included in the monographs for essential oils are generally reasonable and in keeping with our present-day knowledge regarding this class of products.

The galenical pharmacy is perhaps not as thoroughly up to date as one might have expected, a considerable number of complex pharmaceuticals have been retained from former editions of the pharmacopœia and several equally objectionable preparations were included as new remedies. Among the latter is the compound syrup of hypophosphites, a complex preparation that has been the cause of considerable dispute in our own country.

General articles descriptive of the several classes of galenicals have been included and these usually describe the methods to be employed in making and preserving the various preparations. In connection with fluid extracts and tinctures, the color, specific gravity and extract content of the several preparations is given.

A liberal number of assay requirements have been introduced in connection with the preparations of alkaloidal drugs, but the requirements are not stated at all uniformity and in connection therewith some rather liberal variations are permitted. Thus extract of nux vomica may vary from 15 to 17 *per cent.* of total alkaloids and extract of opium from 18 to 20 *per cent.* of morphine. The tincture of nux vomica may vary from 0.25 to 0.30 *per cent.* of total alkaloids but the tincture of opium is to contain *about* 1 *per cent.* of morphine and fluid extract of hydrastis is to contain *not less than* 2 *per cent.* of hydrastine.

Among the newer remedies that have been added we find acetylsalicylic acid, diethylbarbituric acid, camphoric acid, bromoform, ethylbromide, creosote carbonate, eucalyptol, eugenol, hexamethylentetramine, cresol, novocaine, amyl nitrite, silver proteinate, antipyrine salicylate, mercury salicylate, solution of formaldehyde, and the several hypophosphites used in the making of compound syrup of hypophosphites. It will be noted that at least several of these articles are no longer considered new remedies with us in this country, while others have never secured sufficient recognition on the part of the medical profession to warrant their being included in our own pharmacopœia.

The requirements of the Brussels Conference Protocol have been generally followed rather closely. The protocol itself is reproduced in tabulated form and the articles that have been included in the pharmacopœia itself are designated by the addition of the letters P. I. to the sub-titles which are those included in the international treaty.

Table showing the international standard titles included in the Norwegian Pharmacopœia, 1913:—

Acidum Hydrocyanicum dilutum P. I.
Amygdalæ amaræ aqua s. Aqua amygdalæ amaræ P. I.
Belladonnæ extractum s. Extractum Belladonnæ P. I.
Belladonnæ folium s. Folium Belladonnæ P. I.
Cocainum hydrochloricum P. I.
Colchici semen s. Semen Colchici P. I.
Colchici tinctura s. Tinctura Colchici P. I.
Digitalis folium s. Folium Digitalis P. I.
Digitalis tinctura s. Tinctura Digitalis P. I.
Ferri jodidi sirupus s. Sirupus jodeti ferrosi s. Sirupus ferri jodati P. I.
Hydrargyri unguentum s. Unguentum Hydrargyri P. I.
Hyoscyami extractum s. Extractum Hyoscyami P. I.
Hyoscyami folium s. Folium Hyoscyami P. I.
Ipecacuanhæ radis s. Radix Ipecacuanhæ P. I.
Jodi tinctura s. Tinctura Jodi P. I.
Kalii arsenicosi liquor s. Arsenicalis liquor Fowleri s. Liquor arsenicalis Fowleri.
Opii et Ipecacuanhæ pulvis compositus s. Pulvis Doveri P. I.
Opii extractum s. Extractum Opii P. I.
Opii Tinctura s. Tinctura Opii P. I.
Phenoli solutio s. Aqua phenolata P. I.
Secalis cornuti extractum s. Extractum Secalis cornuti; Ergoti extractum s. Extractum Ergoti P. I.
Secalis cornuti extractum fluidum s. Extractum fluidum Secalis cornuti; Ergoti extractum fluidum s. Extractum fluidum Ergoti P. I.
Secale Cornutum s. Ergotum Secale P. I.
Strophanthi tinctura s. Tinctura Strophanthi P. I.
Strychni extractum s. Extractum Strychni; Nucis vomicæ extractum s. Extractum Nucis vomicæ P. I.
Strychni semen s. Semen Strychni s. Nux vomica P. I.
Strychni tinctura s. tinctura Strychni s. Nucix vomicæ tinctura s. tinctura Nucis vomicæ P. I.

The appendix includes a number of tables, among others: An atomic weight table of the elements referred to in the pharmacopœia based on the international atomic weight table for 1910; a list of the reagents used in testing drugs and medicines, also a list of reagents for tests and stains used in the clinical laboratory; a table showing the specific gravity of solutions of acids and alkalies at 15°, a table showing the number of drops in a gramme of several frequently used official preparations when dropped from the official normal drop counter at 15°, a table of the maximum doses of active medicaments, a list of poisonous articles that should be kept in the poison closet apart from other medicines, and a list of potent medicines specially designated in the body of the book that are to be kept separated from other articles; a list of the articles added to the fourth edition of the pharmacopœia and a list of the articles in the third edition, but not continued in the fourth edition. These several tables are followed by a reprint of the Brussels Conference Protocol and by two indices, one an index of the Latin titles with the sub-titles from the International Protocol and the other an index of the Norwegian names. The index of the Latin titles also includes under the several official names of the drugs and chemicals a list of the preparations in which the substances are directed to be used.

Altogether the book impresses one as being an earnest attempt to solve pharmacopœial problems in an up-to-date manner. The directions and requirements appear to be reasonable, and the general concensus of opinion of writers and reviewers is to the effect that the book furnishes satisfactory standards for the articles enumerated in it.

In the limited time that can be devoted to a review of this kind no elaborate critical review of the book can be presented, but enough has been said to justify the statement made by the reviewer in the London Lancet that the work embodies many features of modern research in pharmacy and testifies to the high scientific attainment of Norwegian pharmacists.

DISCUSSION.

MR. RAUBENHEIMER:—"It is certainly gratifying to become acquainted with some of these foreign pharmacopœias, even if we are unable to read them. I would like to ask Mr. Wilbert what edition this pharmacopœia is, in the first place, because that is quite important. I also want to point out that the nomenclature of the Scandinavian pharmacopœia is also used by the Netherlands pharmacopœia. Of course, this nomenclature is entirely different and confusing with the tables of the U. S. P., and you will have to get used to it in filling foreign prescriptions.

"There is one important item I also want to call attention to. I had a call for this from one of the professors in Highland College. It was a Norwegian prescription and it was rather a peculiar preparation. I looked it up for him and it happened to be spiritus ammonii carbonici pyro-oleosi. That was the old spirit of hartshorn. Instead of being distilled from the horns of deer, as done by our forefathers, and which process, I suppose, was official, it is now made by taking ammonium carbonate, and in order to give it this pungent, disagreeable, empyreumatic odor, adding a small amount of ethereal animal oil, the ill-smelling empyreumatic oil distilled from bones, etc., discovered by the Berlin alchemist Dippel. That makes practically the same thing as the old spirit of hartshorn, which is still used in medicine to-day in some countries.

"Regarding the nomenclature, I have no doubt Mr. Wilbert has in his paper the odd titles ætheroleum and pyroleum. The former applied to 'essential oils,' and the latter to 'emypreumatic oils,' and they are very wisely intended to separate these oils into classes by themselves.

"From the review of foreign pharmacopœias the pharmacist can always learn something, and even the members of the Revision Committee of the U. S. P. can receive and conceive valuable suggestions, which may be applied to our own pharmacopœia."

Dr. Wulling stated the matter referred to by Mr. Raubenheimer was one of the subjects the International Pharmaceutical Congress has before it and he thought a proper solution of the subject could be brought about in time.

President Beringer stated he believed the American Pharmaceutical Association had a committee that was giving attention to this matter. The question of titles was one that was prevalent, but there was, nevertheless a practical side of that question. He stated that every pharmacopœia has been made to suit the medical practice and customs of its own country. Now, to change the title under which mixed drugs are to be prescribed in a country, is likely to cause confusion, and he believed the U. S. P. has as pure a system of nomenclature as any of the foreign pharmacopœias; that on the whole he believed our titles to be as pure in following a distinct system of nomenclature as any of the pharmacopœias, and to change the title would really be of no benefit but only lead to confusion.

Chairman Cook stated it was interesting to say, in connection with the subject of international agreements, that the present pharmacopœia revision committee has coöperated with the British Pharmacopœial Committee on uniform abbreviations, and that with very few exceptions abbreviations will be uniform in Great Britain and in the United States.

Dr. Wilbert, in answer to a question propounded by Mr. Raubenheimer, stated the present Norwegian pharmacopœia is the fourth revision, published in 1914. The Scandinavian system of nomenclature, which is the earliest, is adopted also in good part at least in the Belgium pharmacopœia, and as Mr. Raubenheimer said, it occurs also in the Dutch. The matter of foreign titles, he thought, was an important one. Personally, he thought it would have been an advantage as an educational factor to include in our own pharmacopœia the synonyms of the most widely used titles.

President Beringer read a paper entitled. "The Review of the New Homeopathic Pharmacopœia." [Printed in February issue.]

CHAIRMAN COOK:—"If there is no objection, I am going to ask that the exhibition of crude drugs be presented next, and following that, the exhibition of preparations. The crude drugs are supplied from the University of Minnesota, and Prof. Newcomb not being able to remain, we will listen to a statement with regard to them by Prof. Wulling."

PROF. F. J. WULLING:—"Mr. Chairman and Gentlemen: The exhibit before you consists of drug specimens grown and produced in the Medicinal Plant Garden and the Medicinal Plant Laboratory of the College of Pharmacy of the University of Minnesota. The time is limited and instead of giving you a formal address on the subject of medicinal plant cultivation, I will speak only a few minutes on the subject.

"The crude drugs exhibited before you are the bases of many of the preparations which will be the subject of discussion immediately following. The exhibit before you is not as creditable a one as we could have prepared had time permitted. The more important of the drugs included in the exhibit are as follows:

Digitalis, U. S. P.
Digitalis lutea
Digitalis ferruginea
Digitalis lanata
Digitalis grandiflora
Datura Stramonium
Datura tatula
Datura Stramonium, stems, powdered
Datura tatula, stems, powdered
Datura metelloides
Datura metelloides, stems, powd.
Datura fastuosa, cœrulea
Datura metelloides, seed, whole
Datura Stramonium, seed, whole
Datura lævis, seed, whole
Datura fastuosa, alba
Valeriana, U. S. P.
Salvia, U. S. P.
Marrubium, U. S. P.
Chenopodium
Levisticum
Belladonnæ Folia
Symphytum Leaves (Adulterant of Digitalis)
Verbascum Leaves (Adulterant of Digitalis)
Althæa Leaves
Taraxacum, U. S. P.
Coix Lacryma, fruits
Humulus, U. S. P.
Cannabis sativa
Capsicum
Inula, root
Coriandrum, U. S. P.
Conium, U. S. P.

"It occurs to me that the exhibit explains itself in a way and that it might be more interesting to you to learn something of the introduction of this kind of educational work into the curriculum of a pharmaceutical educational institution. Those of you who are sufficiently interested to desire information about the drugs exhibited are asked to read the labels on the respective containers. Much information will be found there.

"I have been asked here, whether I think it is proper for a college of pharmacy to undertake the production of crude drugs. I reply that it is perfectly consistent, indeed, I believe essential, for the best and fullest kind of pharmaceutical instruction for colleges of pharmacy to add medicinal plant gardens to their equipment to strengthen the curriculum. We are very careful to emphasize that we do not cultivate medicinal plants in a commercial way, but we do stimulate especially the coming pharmacists to endeavor to prepare for themselves some of the crude drugs which it has been found upon research and experiment to be possible for them to cultivate satisfactorily.

"Our present medicinal plant garden occupies an area of a little over two acres and was begun about five years ago. Our first garden was begun in 1893, but on account of lack of time and money we did not go on with it. A few years later I used a good part of the plot of ground adjoining my residence in the rear, for drug plant cultivation but this did not prove satisfactory. Somewhat later, the University authorities became more disposed to consider a plant-garden and finally were prevailed upon to allow a sum of money for a garden and to designate a site. Indeed, so interested did the authorities become in the project that they insisted that I visit the more important botanical and medicinal plant-gardens of Europe and this country. I gathered much information from the gardens at Paris, Berlin, Marburg, Munich, London and elsewhere. Much of the information thus gained has been used in a practical way at our College. Dr. E. L. Newcomb, who had had some experience in horticulture and greenhouse work, was secured to carry on the work in pharmacognosy and to carry out the plans for the garden. His services have been very helpful along these lines.

"In order to employ the fullest facilities of the garden, a medicinal plant greenhouse and laboratory was erected immediately adjoining the Pharmacy Building and connected with it by a passageway. This laboratory is unique and is the only one of the kind I know of. It is 32 x 61 feet in dimensions, has a full cemented basement, in which are contained a complete milling-plant, consisting of fanning-mills, disintegrators, limited powdering-mill, thresher and sifters, all operated by individual electric motors. Five spacious drug-drying ovens are used in this basement, together with a series of portable steel drug containers. A separate drying room and a root-cellar adjoin the main basement room. The superstructure is the greenhouse proper, the central portion of which is devoted to a pyramid on which are placed the perennial and some potted annual plants. The lantern is high enough to admit of the cultivation of trees, such as a small sized eucalyptus, tall shrubs, etc. Surrounding this pyramid are cement work-tables for sixty students. An aquarium is also provided. The department of pharmacognosy is located in the Pharmacy Building on the side nearest the plant-house so that communication between the two floors of the pharmacognosy department and the plant-house and the garden is most convenient.

"Some of the plant seeds are sown early in March or late in February in the plant-house. At the proper time the young plants are taken from the pots in which the seed was sown broadcast and placed into flats where they are allowed to develop until they are large enough to be transplanted into individual pots in some cases, or until they may be planted in the open in the garden. In the garden the necessary care is given to the needs of the individual

plants to the end that the best possible crop of each is secured. Most of the crop is not ready for gathering until the students return in September. The students do most of the harvesting, drying, assaying, powdering and preserving of the drugs, of course under proper direction and supervision. The work is not done in any haphazard way. In drying the harvest, for example, some drugs are dried by gas heat, others by steam heat. Full data are kept of the moisture before, and at stated times during the drying. The temperature is always under proper regulation. Certain of the drugs are subjected to assay and to other pharmacopœial tests, before they are finally declared ready for conversion into preparations in the pharmaceutical laboratories. We have found that most of the drugs we have undertaken to cultivate, meet the pharmacopœial requirements, and in some cases exceed them. Our digitalis, for example, so far has met, at the end of the first year, all the requirements exacted of the official drug. In this connection, it should be remembered that we begin cultivation in the plant-house early in March. No doubt other regions could demonstrate equally, that with proper care and conditions digitalis could be grown elsewhere in one season that would meet the two-year's requirement of the Pharmacopœia and thus much could be gained.

"This kind of work is, of course, still in its initial stage. So far we have not published any bulletins covering our research work along these lines, but we expect to be able to issue such bulletins soon. The interest in this kind of work is very pronounced. Within a period of about a year following the beginning of our work, we had several thousand letters inquiring how to grow some of the medicinal plants commercially. Some of the correspondents inquired for full information as to how to make a profit of from three to four thousand dollars per acre. We replied to all letters emphasizing the need of more than a mere agricultural training in the cultivation of medicinal plants, and we discouraged them, as we do now, this kind of cultivation by all who have not had some special pharmaceutical or medical training. However, we are advising pharmacists to look into the matter and cultivate some plant drugs We have advised some to cultivate such drugs as peppermint, spearmint, horehound, ginger, etc., even if they have not the courage to cultivate the more potent medicinal plants. There is no doubt in our minds that more money could be made by the cultivation of some of the commoner medicinal herbs, than could be made from the cultivation of potatoes or wheat. The point we emphasize is, that the cultivation of toxic medicinal plants ought not to be carried on by others than pharmacists or by those similarly qualified. We tell the farmers it is necessary for the successful cultivation of such drugs as digitalis, belladonna and stramonium, to have some pharmacologic training. The average farmer has not sufficient qualification without further preparation to cultivate drugs.

"It is not necessary for colleges of pharmacy to have an expensive plant in all cases for the cultivation of the more representative drugs. While we have expended something over $25,000.00 on our department of pharmacognosy, including the plant garden and plant laboratory, some institutions are doing creditable work with a much smaller and less representative equipment. Our beginning was a very modest one, but by perseverance we have finally been able to develop it to a certain degree. We found the greatest difficulty in creating a favorable sentiment for this kind of work among the authorities. When that was overcome, the rest followed naturally. Possibly others would succeed similarly if they made the beginning."

MR. MAYO:—"In view of the very great shortage in our supply of the drugs grown in Europe, it seems to me we ought to pay some attention to the immediate future supply, especially to such as are available in our own fields. I know we have a good many drugs that are indigenous growing in various sections, which we have not cultivated for various reasons. I am under the impression that, at the very high prices which now prevail, we won't have to convince the farmers of the advantage in cultivating some of these drugs. It might be well for this Association to see whether it is not feasible to make good at least a part of this shortage by a collection of indigenous drugs. I therefore move you, as carrying out this idea, that this section recommend to the general session that a committee of five be appointed to investigate the feasibility of a collection of this year's indigenous drugs to supplement the foreign supply, and to take such steps as may seem to them to be proper without incurring any expense to the association. The department of agriculture have issued bulletins on this subject and they might be very glad indeed to coöperate with us.

"I believe this Association should take the initiative and I therefore move you that the section recommend to the general session that a committee of five be appointed to investigate the matter, and if feasible, agitate for the collection of botanical drugs."

CHAIRMAN COOK:—"You have heard this motion, which is a very excellent one at this time because of the very peculiar condition of the market."

DR. SCHNEIDER:—"I second the motion. In addition to this idea advanced by Mr. Mayo in his motion, I would like also to call more specific attention to the advisability of entering into the growing of medicinal plants right here in the United States as a commercial proposition. I have worked out in every detail the growing of belladonna as it should be grown, along the Pacific coast. To this end we have devoted I should say, roughly, about five or six thousand dollars, and I have put into it perhaps some five or six years of my time. So far we have sold perhaps, estimating it roughly, some fifteen tons of belladonna. I think I could get as much as five dollars a pound for belladonna if I had it, but I have not got it. The price of

belladonna in the past has been so low we could not compete successfully. I think the motion should include also an instruction that the committee should look into the cultivation of the plants."

MR. MAYO:—"I will gladly accept that as an amendment."

CHAIRMAN COOK:—"You all understand the motion, I think, that a committee of five be appointed to look into the question of collecting and cultivating indigenous medicinal drugs and other drugs than those indigenous to assist, if possible, in relieving the drug market."

The motion was adopted.

CHAIRMAN COOK:—"The time has come now for the consideration of the exhibit which is before you. I would like to say a word or two about this exhibit, its purpose, the manner of collection of the samples, and the way in which I hope we can gain some benefit from its consideration.

"As you all know, the United States Pharmacopœia, 9th revision, and the National Formulary, 4th edition, are practically completed in their revision. The formulas which are proposed for inclusion are available, and many of them have been published. The books are practically ready to print to-day. It was suggested that, at this section, we could be of great help to the committee of revision and the members of the association who were present would be very much interested no doubt in seeing an exhibit of the new preparations proposed, and those older preparations which have been modified. With that in view, a number of pharmacists, fifty or more, were asked each to prepare six preparations. We had excellent responses from these requests; I think all but about four, who had legitimate excuses, complied. The preparations on this row represent those made by the pharmacists very recently. The preparations on the three lower shelves are those which have been contributed from time to time by the sub-committees of the Revision Committee to substantiate their reports. Some of them are two, three and four years old. This exhibit was undertaken with a view then of giving the pharmacists here an opportunity to see what these preparations were, for the purpose of trying to clarify a few points which have been severely criticized and also for subsequent exhibition in association work. Anyone who is interested in having this exhibit for one of their meetings this winter, can arrange for it.

"It is the intention here this morning to select from this set of specimens a small group, ten or possibly fifteen, depending upon the time which we have, of these preparations which have been especially discussed, and about which there is some question as to the formula. Reports have been sent in,—quite a voluminous series of reports from all the pharmacists who have made these preparations. I have selected a group of about ten which we will take up first. When these have been given adequate consideration, and it must be limited to ten minutes or we will not be able to get through, we will then take up others if there is any time remaining. If you have any suggestions, may I ask you to write them out now and hand them to me? All of these recommendations will be transferred immediately to the revision committee.

"The first preparation I wish you to consider is the preparation of Syrupus Ferri Iodidi, which has been modified to the extent of omitting the dilute hypophosphorous acid as a preservative. Two samples have been submitted, one from Philadelphia, and one from Massachusetts. I have also a sample by Mr. Beringer. The results are before you. Apparently the new modification is a very great advantage.

"The next preparation I wish to have you consider is Magnesiæ Magma. This preparation was formerly in the National Formulary. It has been introduced now into the United States Pharmacopœia. The formula that has been approved is one that was adopted by the National Formulary Revision Committee before it was known the United States Pharmacopœia would adopt the preparation. I have here five samples made up by this new formula. Has anyone anything to say of this preparation? The new formula has been published in the Journals in the last few years. This is a modification of the present National Formulary formula, and I should be glad to hear anyone discuss this in assisting the Revision Committee to a final conclusion."

MR. HOSTMANN:—"The main objection I have to Mr. Beringer's formula was the long time of washing and the quantity of water required. I do not believe it is necessary to wash with distilled water. If you want a white preparation, it is necessary to have water that is absolutely free from iron. When we were working on it, we took a large quantity of hydrant water, boiled it first and then shook it up with magnesia oxide and magnesia carbonate and let it settle and decant and used it for washing purposes. I have not had any experience with the formula that is proposed for adoption, but I do know that you get a very nice preparation, a very smooth preparation, one that pours easily and stands up very well. You do have to wash a very long while and must be very, very careful that your magma never dries on cheese cloth."

S. L. HILTON:—"The preparation itself is a mechanical one pure and simple, and one that cannot be hurried in its manufacture; the best results I have been able to obtain is by sedimentation and not by straining; straining is liable to make the finished product more or less lumpy so that it will be impossible to obtain a smooth product. Further, the straining process may be satisfactory for a litre or two, but if you make a quantity of the preparation, for instance, forty gallons, how are you going to strain that amount of magma? It is impossible

to handle it in that way. Consequently, for large quantities, sedimentation is far better and I have also found that for small quantities it is equally satisfactory, more cleanly, and gives a better finished product. I use a much stronger solution of Magnesium Sulphate and solution of Sodium Hydroxide. I do not use hot solutions, as I have found by experiment they are not necessary. The condition of the magma formed, is in my judgment governed entirely by the way the solution of Sodium Hydroxide is added and the rapidity of agitation of the solutions at the time of mixing. The strength of the magma as obtained by the formula suggested, that is the amount of Magnesium Hydroxide in suspension, is insufficient, it is far less than the proprietary preparations for the reason that the solutions you start with are not strong enough. The Magma Magnesia obtained by this formula will assay only about five and a fraction *per cent.*, the proprietary will assay six *per cent.* The product I have been making will assay from six and one-half to six and three-quarters *per cent.* and after assay I adjust same to six and one-half *per cent.*

"Unless water free from iron and organic matter, can be obtained it is necessary to use distilled water or the product will not be perfectly white, and some attention should be paid as to the amount of sulphate remaining in the finished product. It is not necessary to carry the washing to the point where all or practically all of the sulphate is removed; a certain definite amount of sulphate remaining in the finished magma has a decided advantage; it assists the laxative action of the preparation and, unless this be excessive, it does not have any unpleasant taste in the finished preparation. I have adopted a standard of my own on this point and every lot made is adjusted to contain a definite amount. I think this should be taken into consideration and provided for."

CHAIRMAN COOK:—"The next preparation is the magma bismuthi. The formula has not been an official formula in any of the standard books. This is now proposed for inclusion in the pharmacopœia. We have a number of criticisms of the formula.

"Dr. Francis can probably tell us something about this phase of the formula."

DR. J. M. FRANCIS:—"Because of limited time I did not intend to offer any suggestions, but as it has been requested by the chairman, I would say that my extensive experience in the manufacture of Milk of Magnesia and Milk of Bismuth warrants the statement that there are several details of the process which demand more careful consideration.

"In the case of Milk of Bismuth, containing the quantities of ingredients specified in the proposed formula, it is a fact beyond dispute that by varying the temperature and the several manipulative details, one can produce a Milk of Bismuth so dense, or in other words, so thick that it cannot be poured out of a bottle having an ordinary mouth, or, on the other hand, a magma can be produced consisting of such a coarse powder that an excessive proportion of water will separate on standing and the product will be wholly unfit for use. The same statement as to the possibility of varying the density of the magma is equally true in the production of Milk of Magnesia.

"I have taken occasion to criticise the formulas for both the Milk of Bismuth and the Milk of Magnesia, to the effect that the maximum quantity of water-soluble salts allowed to be present, is entirely too small. The chief item of expense in the preparation of both of these preparations, is the large volume of distilled or filtered water required for washing, or for the removal of the soluble salts produced by the chemical reaction. If this washing is extended, so as to greatly increase the volume of water necessary, the cost of the water will actually exceed the cost of the medicament employed. Certainly, the washing of the magma should be continued until only traces of the soluble salts remain, but a considerably greater quantity of the soluble sulphates or chlorides should be admitted than is proposed by the formulas which have been offered for adoption. What harm could possibly result either to the stability of the preparation or to the patient using the Milk of Magnesia or the Milk of Bismuth, by the presence of traces of soluble chlorides or sulphates?

"In this connection, it is also well to consider the great variation in the content of hydrated oxide of magnesia on the one hand and hydrated oxide of bismuth on the other, in the several preparations now very widely marketed by different firms. There should be some uniformity, and while the degree of concentration should be placed reasonably high, it should also be kept within the limits of economical production.

"Another fact brought out by Prof. Cook, in the previous discussion, is the question of indicating the value of these two preparations in terms which are comprehensible to the average physicians. While a statement to the effect that each ounce of Milk of Bismuth contains a given number of grains of hydrated oxide of Bismuth is scientifically correct, it means little to the average doctor. Physicians seldom or never prescribe the oxide of bismuth; this is not a commercial article. They are, however, entirely familiar with the dose of subnitrate of bismuth, and if we state that each dram or each ounce of milk of bismuth is equivalent to ——— grains of bismuth subnitrate, they can easily determine dosage.

"It should also not be forgotten that in the process of manufacturing, milk of bismuth should always be left distinctly acid in reaction, as otherwise it will shortly revert to the alkaline or neutral state, and in this condition will rapidly discolor on exposure to light. Sometimes even a dark mirror of reduced bismuth will cover the entire inner surface of the bottle."

CHAIRMAN COOK:—"The next preparation is the solution of iron albuminate of the National Formulary. I will ask Prof. LaPierre his difficulty."

PROF. LAPIERRE:—"My difficulty was in reference to the addition of sodium citrate. I had no difficulty at all in the solution of albumen or in the addition of iron to the albumen. But at the time of the addition of the sodium citrate the precipitation of the iron occurred and it would not go again in solution notwithstanding all sorts of arrangements to coax it back into solution again. I tried it with a smaller quantity of sodium citrate with no better results. I am open to instruction along that line. I believe that is going to be the trouble with that preparation."

CHAIRMAN COOK:—"Anyone else have a suggestion to make in regard to this difficulty? I might say that the National Formulary Committee in preparing this formula have found it necessary to advise that the iron oxychloride be freshly made and used immediately."

PROF. LAPIERRE:—"I made the oxychloride fresh and we had no difficulties with that same iron in the preparation of peptonates."

CHAIRMAN COOK:—"The next preparation is one which has been causing discussion back and forth during the entire revision work of the pharmacopœia. There is the much mooted question of soft soap, one made from cotton-seed oil, the other from linseed oil. The subcommittees that have had this preparation in charge have unanimously agreed—probably I should not say unanimously—but the committees have all agreed to introduce the cotton seed oil soap. I personally believe it to be a great improvement over the other formula. We have here samples of the U. S. P. linseed oil soap and the proposed cotton seed oil soap.

"The chief objection to this formula is that the claim is made that it is not as detergent. Is there any discussion on this subject. I know that the cotton seed oil soap particularly has been used very extensively for a number of years by some larger users, and it has proven very satisfactory.

"If there is no discussion, the next preparation is compound solution of cresol, which has caused very much criticism. The present formula as now proposed for the pharmacopœia, calls for the saponification of linseed oil, making linseed oil soap, and the subsequent solution of that in cresol."

PROF. SCOVILLE:—"In other words, you will find that cresol is as good a solvent for soap as alcohol, if you dissolve your oil directly in the cresol and then add the alkali solution; saponification takes place in the cold, and that quickly. But you cannot use the preparation at once because you find that it clouds when diluted. It does not mix immediately. The difficulty there is that the saponification is not complete, although your solution looks perfectly clear. You can remedy that, if you choose, by heating it, but if you do that you darken your preparation. In order to get a light colored preparation it is necessary that you should let it stand."

CHAIRMAN COOK:—"The main argument in the committee against the use of directly dissolved soap, was that large variation was found in the soft soaps in the market and it was feared they would not be official soft soap. That led the committee to recommend the making of the soap. Again, I believe an inference would be permitted here, by the clause in the pharmacopœia to use a soft soap as a starting point, if we know the end point is all right."

MR. I. A. BECKER:—"I have had no complaint from the doctors, or in making a perfect preparation so far as its pharmaceutical preparation is concerned, by simply taking the cresol in equal weight to the soft soap and stirring it up and letting it stand twenty-four hours to thirty-six hours, when it readily dissolves. I might add that that thick solution readily goes through filter paper."

CHAIRMAN COOK:—"If there is no further discussion we will go to the next preparation, Glycerite of Bismuth.

"I have understood that Prof. Scoville has made a special study of this preparation, and we will be glad to hear what he has to say."

MR. W. L. SCOVILLE:—"The suggestion I made on the preparation, is that according to the present formula there is a loss of ten to twenty *per cent.* of your bismuth. Still, of course, it is an official preparation. The loss comes from the fact that in the very acid mixture that is first obtained,—not solution but mixture—after the bismuth is dissolved in nitric acid, we add tartaric acid, and then bicarbonate of soda, and we get a heavy precipitate of bismuth tartrate. That is supposed to carry down all the bismuth, but it does not. The solution is entirely too acid, and my modification simply calls for the addition of some bicarbonate of soda so as to throw down as much as possible of the bismuth. I have never been able to get it all down. The formula makes that loss within five *per cent.*, that was as close as I was able to make it. The formula, as submitted, would probably make nearer to 950 cc. instead of 1000."

CHAIRMAN COOK:—"Anyone else have anything to say with regard to this preparation of Glycerite of Bismuth? (No response.)

"The next preparation is the elixir of the phosphates of iron, quinine and strychnia. This preparation has received merited discussion *pro* and *con*. The formula which is proposed is one submitted by Mr. Beringer at the meeting of the New Jersey Pharmaceutical Association some time ago. There has been another formula proposed by Prof. Caspari, which is a modification of the one now official, which requires no neutralization. It is allowed to re-

main acid. But the chief objection to the formula of Mr. Beringer is the tendency to darken slightly. At temperatures such as we have here this morning, the preparation is a very beautiful one. It is made quickly. It does not vary quickly in color; it is recommended to be kept in amber colored bottles, but as soon as the temperature reaches that of ordinary fall weather, precipitation occurs in some instances.

"I have put it directly on the ice and you see the precipitation.

"The Caspari formula has the same precipitation. I have had them both on the ice. So we have the peculiar situation of having two formulas each having the same objection.

"Here is another of the Beringer formulas proposed, showing the precipitation. I will be glad to have some discussion on this point."

MR. W. L. SCOVILLE:—"There is no more delicate or troublesome formula in pharmacy today than that of the elixir of phosphates of iron, quinine and strychnia. It is a very easy thing to make a preparation that will look good for a week or two, or a month or two; it is another proposition to make one that will stand for a year or two, and stand changes of temperature and exposure.

"There are two or three things about that formula that I do not think are very much understood. One is the action of light on the ferric salt, particularly in the presence of citrates. So I ask, is it understood that light causes the decomposition of citrates by ferric salts? A normal citrate will entirely be decomposed by the ferric salt if it is exposed to the light. That is one reason why that elixir should never be put up in a white bottle, no matter what your formula is.

"Another difficulty is, that if you get in an organic acid in the presence of quinine, you have some of your quinine changed to a poisonous form, quinotoxin. It is the explanation of some disintegrations of quinine, perhaps,—troublesome reactions; illness after taking quinine. It occurs in the presence of quinine with organic acids. With mineral acids you are not likely to have any difficulty.

"One of the difficulties in the past, of course, has been the presence of sugar. You cannot put sugar in a preparation of that kind without it darkening. The new formula uses glycerin, which is a decided advantage.

"The action of light, the influence of quinine and the acidity, all have an important bearing on that preparation. I think I have made, without any exaggeration whatever, 200 tests of formulas for elixir of phosphates of iron, quinine and strychnia. The more I make the more I respect that preparation. It has got me guessing. I do not feel discouraged over it, however. I expect some day to have something that is really worth while. I do not know whether I have it now or not. It takes time to find out. The difficulty is, I cannot find out for a year and a half whether I have what I expect or not. I thought I had it six months ago, but some difficulties came up. I have some more standing. I have some standing in a wooden box outside my window. It is going to stand there all the time, through summer and winter. The only thing I exclude is the light. Any formula that would stand the light would not be a ferric solution; you might make a ferrous solution."

DR. WILBERT:—"I believe an immense amount of time and money has been wasted on this preparation, and for no real good reason.

"A number of years ago Prof. Diehl introduced in the National Formulary his well known formula for elixir of pyrophosphate of iron, quinine and strychnia. This preparation is easily made, can in fact be thrown together, and will keep almost indefinitely without much change. I think we have devoted altogether too much time to the fetish that the ingredients must be present in the form of phosphates. The elixir of pyrophosphate is readily made and will stand fairly well."

MR. W. L. SCOVILLE:—"I would like to call Mr. Wilbert's attention to the sample of elixir of pyrophosphate of iron, quinine and strychnia on the case there."

CHAIRMAN COOK:—"Any further suggestions about this preparation? I would be very glad to have the help of the members."

"All these criticisms, I hope you understand will be very carefully noted and referred immediately to the committee on revision.

"The next preparation is the new aromatic fluid glycerate of cascara sagrada. I have three samples here. This is a new preparation and is here for your observation.

"The next preparation is the tincture of ferri citro-chloridi of the National Formulary, the basis of the making of elixir iron, quinine and strychnia without the phosphate. There was considerable criticism of this formula. It will be referred to the committee on revision."

MR. WM. A. HALL:—"Having had this work in hand I did not expect any particular trouble, but I was particular in getting a solution of chloride of iron for my base that was strictly U. S. P. and with a gravity of 1.310. Using that as the basis, taking the requisite quantity of sodium citrate called for, 425 grammes, I found I did not have a green but a brown solution. Of course, I knew I did not have enough sodium citrate. I kept on adding until I had added 100 grammes, making 525 grammes, to make the reaction complete as shown by the emerald green color. Then I took another sample of solution of iron, which had a gravity of the 1890 U. S. P., namely, 1,290, and found 425 grammes sodium citrate was practically enough. I added 20 grammes more, but the little difference might be simply the little variation in reading the gravity. I would not criticize it on that score. But with the

specific gravity of 1.310 it certainly required more sodium citrate. Then I began looking it up and sent the memoranda of the details to our Chairman for action before the National Formulary Committee.

"With the gravity of a solution of iron of the last pharmacopœia, the trouble is that we have increased the gravity or the strength of the solution of iron in the present pharmacopœia beyond that of the last and we have not changed the quantity of sodium citrate. That is the whole substance of it. So that it would seem as though it will have to be threshed out a little more; that the sodium citrate will have to be increased."

MR. F. M. APPLE:—"That was my experience in making up the preparation."

CHAIRMAN COOK:—"The next preparation is a new preparation for the National Formulary, a compound solution of phosphates. This preparation was made with the intention that it would form a stable concentrated solution for the making of a number of other preparations which call for phosphates; notably the syrup of phosphates.

"I have samples here made over a year, and one made more recently, and quite extensive criticism of this formula by Mr. Hensel of Denver, together with criticism from Dr. Englehardt of Baltimore. The criticisms will be referred to the National Formulary Committee. Has anyone anything to say about it?

"If not, the next preparation is the syrup made from this solution, which is also here for you to see, showing quite a striking difference in the two preparations made by the two men.

"The next preparation is the tincture of cudbear of the National Formulary. This preparation has been the cause of probably more discussion in the National Formulary Committee than any other one preparation. The preparations are here before you with some notes with regard to difficulty in percolation, which has been the old story in regard to this preparation.

"The next preparation is an antiseptic solution of pepsin. This preparation received considerable comment when it was published in the Journal a number of years ago. It is a stimulating antiseptic wash for wounds, I believe."

DR. WILBERT:—"There is nothing to say except that it is a wash used for cleaning and flushing wounds. It has been used extensively in surgical practice and with satisfaction. We have made it at the hospital for a number of years and it has been used there and in other places. It is not intended at all for internal use."

MR. EDSEL A. RUDDIMAN:—"What effect has the antiseptics on the action of pepsin? Do they interfere there with the digestive action of pepsin?"

DR. WILBERT:—"Possibly they do, but we make the preparation up fresh. It is never kept more than a couple of months. The loss in activity is not material and we have never had any complaint from it, at least not in my time."

CHAIRMAN COOK:—"The next preparation is the syrup of hydriodic acid. The formula is here rather for you to see than to comment upon specially. I might say that glycerin has been omitted in the preparation of syrup of hydriodic acid. This was originally proposed but found to be objectionable. The formula is modified to this extent. This is practically the same as the present U. S. P. excepting that the amount of hydriodic acid is slightly increased so that instead of one *per cent.* I think we will have about 1.25 *per cent.* present. It is also made up instead of by weight, by mixing volumes.

"The next preparation that I have on my list is solution of magnesia citrate. Unfortunately, the sample was broken in transportation. I have had a number of criticisms. Anyone who would like to say anything about the newly proposed formula for solution of magnesium citrate?

"If there is no discussion, the next preparation will be elixir of phosphorus. The preparations you have before you. The old criticism that has come in, is that they prefer the old method. The formula itself is probably satisfactory.

"That concludes the preparations that I had specifically selected in filling out the program as I had planned it.

"I would now ask for the reading of the paper on zinc oxide ointment by Mr. Ernest R. Jones."

A NEEDED CHANGE IN OINTMENT ZINC OXIDE, U. S. P.

ERNEST R. JONES, PH. C.

It is a well-known fact that this ointment, after standing for a little while, becomes very granular and is anything but a sample of pharmaceutical elegance.

Most of the previous papers on this subject have ascribed the cause as due to the zinc oxide or to faulty compounding of the formula, and have suggested changes in the manipulation of the present formula which were expected to produce a permanently smooth ointment.

Some have advocated rubbing the zinc oxide until thoroughly smooth with a small quantity of a fixed oil, such as castor, olive or cottonseed oil; then incorporating the lard. Others have tried the expedient of first bolting the zinc oxide very finely. Another endeavored to accomplish the same purpose by a process of elutriating the zinc oxide.

It is very doubtful if any of these persons have kept their product under observation during a sufficient length of time, say perhaps a year, in order that it could have encountered the different changes in temperature. I have tried all of the different suggestions, but have not as yet found any that solved the difficulties. I recently had an opportunity to observe a one-pound sample of U. S. P. ointment which had been made according to one of these new schemes of manipulation and which, after setting undisturbed on the shelf for over a year, was apparently as good as when made. It seemed to have solved the difficulty, until upon digging down toward the bottom of it, we found that the lower portion was soft, granular, and almost semi-liquid, whereas the top portion was smooth and hard. This would indicate that a separation of the constituents of the lard had taken place.

The writer once had an idea that possibly enough saponification took place between the free acids of the lard and the zinc oxide to liberate enough water to cause the trouble. There is no doubt that some zinc compounds are formed with the acids, for they may be separated with ether. Careful estimation of the amount of water present in the ingredients before making them into the ointment, and estimations of the amount present in the ointment after standing six months, showed that this reaction does not take place to a degree sufficient to cause the granulation.

With a view to determining whether the granulation was caused by the zinc oxide not being in a fine enough state of division, my co-worker, Mr. French, made up a sample following the U. S. P. directions carefully, and then passed it through an ointment mill ten times. Surely the zinc oxide must have been fine enough after this treatment to eliminate any cause for trouble in this respect. However, after a short while it was just as granular as the others.

You gentlemen are all familiar with the composition of lard and know that its constituents vary considerably in physical characteristics. The glyceride of oleic acid is a liquid, while those of palmitic and stearic are solids. If you will examine good lard under a low power microscope, you will observe that it has a very "seedy" appearance, indicating that it is not entirely a homogenous mixture of the combined glycerides. As a warmer temperature is attained, my opinion is that the olein, on account of its liquid nature has a tendency to separate and that upon cooling again without stirring, the stearin and palmitin being more solid, is partly separated in such a manner as to cause the granular appearance.

I have here for your inspection, a sample of benzoinated lard which, four months ago, was as nice a product as one could desire. Granular lumps are now perceptible to the naked eye. This is strong proof that the cause of the trouble is not due to the zinc oxide, but rather to the lard.

My conclusion is then, that just as long as we continue to use benzoinated lard for a base, we must continue to expect trouble from this ointment.

That the lard is the cause of the granulation can be proved by substituting

petrolatum in its place. Such an ointment will remain smooth for an indefinite period. I have here a sample that is nearly one year old, and is perfect in appearance.

It is not my purpose to suggest another method for manipulating the present formula so as to make a permanently smooth ointment, for because of the peculiar composition of the lard, which was previously explained, I do not believe it can be done.

I sincerely believe, however, that the next edition of the U. S. P. should replace the benzoinated lard with a petrolatum base. This idea is not original with the writer. The Swiss and French Pharmacopœias use a base of white petrolatum, thus proving that two countries are aware of its superiority. Several manufacturing houses have, during the past few years, made a special ointment with a petrolatum base, in addition to the regular U. S. P. product.

The question may be raised that lard is better absorbed by the skin than is petrolatum, and according to some recent research reports it is quite likely that it is. Cushny says that "emollient preparations promote the absorption by the skin of drugs dissolved in them because the fat mixes readily with the thin layer of oily sebaceous matter which covers the skin." Inasmuch as the zinc oxide is not dissolved in the lard, the difference in absorption value between lard and petrolatum is of little value in this case. Just how zinc oxide ointment acts when applied to the skin, is hard to determine. Some claim it to be merely soothing. If so, would not the result be just as satisfactory without the zinc oxide? Others claim it to be healing because of its astringency. This seems quite probable, and Cushny says the astringency of zinc compounds is due to their forming insoluble albuminates. This is purely, then, a local action and in my opinion should take place from a petrolatum base as well as from lard.

If the choice of base has no advantage from a therapeutic standpoint, but has from the pharmaceutical, why should we not make a change in its formula?

The simplest formula would consist of 20% of zinc oxide and 80% white petrolatum. This makes a fine product, but is quite a bit softer than we are accustomed to see it and would therefore alter the consistency of every other established preparation which it enters into. The following formula, which is hardened with white wax gives a product resembling the consistency of the present ointment.

Zinc Oxide	200 Gm.
White Wax	150 Gm.
White Petrolatum	650 Gm.

Rub the zinc oxide, which must be free from gritty particles, with an equal weight of melted white petrolatum until smooth and add to this the remainder of the white petrolatum which has been previously melted with the white wax. Strain the ointment while warm and stir thoroughly until it congeals.

One more point of interest, is that the U. S. P. ointment is stronger than that of any other Pharmacopœia. Those of the Swiss, Spanish, Japanese, French, Netherlands and German Pharmacopœia contain 10% of zinc oxide; the Austrian and British, 15%; and finally the U. S. P. which stands alone with 20%. I believe that 10% of zinc oxide is quite sufficient, inasmuch as it is probably not absorbed by the skin, and the extra 10% is wasted.

These suggestions are presented, not as representing any new discovery, but with an idea of trying to convince the Revision Committee that the time has arrived to change the base of this ointment and avoid inflicting another ten years of hardship on the pharmacist.

The white petrolatum base makes a smooth, white ointment which does not granulate or turn rancid. Why not adopt it in the next U. S. P.?

DISCUSSION.

MR. STOLZ:—"That paper appeals to me, and I thank the gentleman for having written such a beautiful paper, because I think zinc ointment is a very serious question with a great many of us.

"A number of the manufacturing houses put up zinc oxide ointment and we buy it in twenty-five and fifty pound lots. We happened to get in a jar from Squibb & Son and when we had used about ten pounds of it it became granulated. We took it up with the representative and he simply told me 'Mr. Stolz, we make our ointment U. S. P. with benzoated lard. We hear that complaint all over.'

"I would like to ask Mr. Cook if they have done anything in the new Pharmacopœia toward changing the base."

CHAIRMAN COOK:—"The formula is to be retained."

MR. GRAY:—"I have been serving the leading physicians of Chicago in a hospital for eight years, and we have used nothing but the vaseline base for zinc ointment."

MR. I. A. BECKER:—"My house also furnishes a zinc oxide ointment with vaseline base."

DR. WILBERT:—"We have been using it for twenty-five years,—so long as this is an experience meeting."

MR. STOLZ:—"You will find ninety *per cent.* of manufacturing houses sending out zinc oxide ointment with petrolatum base."

MR. E. R. SELZER:—"I move that this section recommend to the Revision Committee the adoption of petrolatum as a vehicle instead of benzoated lard."

MR. WILBERT:—"I second the motion."

CHAIRMAN COOK:—"The motion before the house is that it is the sense of this section or at least it is recommended by this section that the Revision Committee adopt petrolatum instead of benzoated lard in zinc oxide ointment."

Motion duly carried.

MR. L. C. HOPP:—"I think the great trouble with zinc oxide ointment is that the benzoated lard becomes slightly rancid, and you can overcome that to a certain extent by using a little alkali mixing it with your lard. I tried that and it worked out all right. We have doctors who insist that lard be used in their preparations, and one man in particular, when he is prescribing zinc oxide ointment and don't know where the prescription will be put up, specifies 'This shall be made up with benzoated lard.'"

MR. GRAY:—"I would suggest, if it is in order, that we classify our ointment absorbent and non-absorbent. I believe some pharmacopœias do that."

MR. JONES:—"I anticipated some argument on this question and I would like to say I have worked on some experiments to see if we could not use a mixed base of benzoated lard and petrolatum, and I found I could use twenty-five *per cent.* of lard and still make quite a good ointment, but the experiment has not been standing long enough to warrant me in incorporating it in the paper. They have been standing about six months and look very good."

MR. W. F. JACKMAN:—"This is one point I do not think we have considered, a number of our citizens in the United States object to the hog on religious grounds as well as sanitary grounds, and to meet such a situation one-fourth wool fat and three-fourths petrolatum. I think is fully equivalent to the formula under discussion."

CHAIRMAN COOK:—"The next order of business on the program is the election of officers, but as explained to the section on Tuesday, the Council have directed or have arranged in their own minds that this section be discontinued as a section. It becomes a special committee of the Practical Pharmacy section. The chairman of that special committee is to be appointed by the Section of Practical Pharmacy.

"All the other set features having been taken care of, I will offer the opportunity at this time,—it is just twenty minutes to twelve and the automobile ride, I believe, is at 2:30—I will allow any time now to the consideration of any one of these preparations before you, which you may be specifically interested in. We will get the samples out here and give you an opportunity to tell briefly, if possible, any difficulty you may have, so these criticisms may go before the committee. All the criticisms that have come in will be before the committee."

DR. WILBERT:—"Before the members leave the room, and in view of the fact that this is the last session of this particular section, I would like to move a vote of thanks to the Chairman for the excellent work he has done in connection with this particular section. I think his getting together this exhibition is an object lesson that may well be appreciated, and the only unfortunate thing is that more men in the retail business have not been able to see it

or have not taken time to look at the various preparations of the exhibit and profit by the possible short-comings that have been evidenced thereby.

"I would move, Mr. Secretary, that a rising vote of thanks be extended to the Chairm for the excellent work he has done in this section."

SECRETARY THUM:—"A motion has been made and seconded that a vote of thanks be extended to Chairman Cook for the excellent work he has performed in this section. All in favor of this motion will please rise."

(Unanimously carried.)

CHAIRMAN COOK:—"Thank you, gentlemen. I am sure that the success of this section has depended upon the splendid coöperation of about fifty members of the A. Ph. A., and thanks are due them.

"If there is no special preparation you wish to discuss, a motion to adjourn will be in order."

DR. WILBERT:—"I make the motion, Mr. Chairman."

Motion carried.

HIGH EXPLOSIVES IN WARFARE.

The high explosives being used for artillery shells in the war constitute the subject of an interesting article in *Nature*. For military purposes explosives of the nitro-glycerin class and many others are excluded, because the military high explosive must be sufficiently insensitive to shock to prevent its being exploded when struck by projectiles or when submitted to the shock of being fired from a gun as the charge of shell. Gun-cotton, containing a considerable amount of moisture, was formerly used for many years. This provided an excellent and safe explosive for military mines and purposes of destruction and as a charge for torpedoes, but was not suited for use in shells. The high explosives chiefly being used for shell-firing at present are picric acid, trinitrotoluol, and ammonal. Picric acid, which superseded black gunpowder, has been in use in most countries under the names of melinite, lyddite, shimose powder, etc. But, although sufficiently insensitive to shock, it has the disadvantage of readily attacking metals and forming picrates, which are much more sensitive and liable to explosion. Ammonal is a mixture of ammonium nitrate, trinitrotoluol, charcoal, and aluminum in fine powder. It is safer and more powerful than picric acid, but needs to be very carefully guarded from moisture on account of the hygroscopic character of ammonium nitrate. Trinitrotoluol, known under the names of Trotyl, Tritolo, Tolite, Tritol, Trilite, and T.N.T., is the most widely used military high explosive. It is less sensitive to shock than picric acid, is chemically stable and unaffected by water and metals, and can be fused and run into shells in the molten state. Hard blocks of suitable size and shape are covered by electroplating them with copper, to prevent their being broken or chipped. The destructive effect of an explosion is caused by the almost instantaneous conversion of the solid explosive into gases at a very high temperature, with the consequent sudden exertion of an enormous pressure. In addition, where the explosion takes place in a closed space, the resulting gases, especially carbon dioxide, may have poisonous effects on anyone having to breathe them.

Scientific Section

Papers Presented at the Sixty-Second Annual Convention

MORPHINE NITRATE AND MORPHINE ACETATE.*

H. ENGELHARDT AND O. E. WINTERS.

The variation in purity of commercial morphine nitrate and morphine acetate is very marked, as we have found in our experiments on numerous samples of the salts. In order to find out the extent of such variations the following experiments were undertaken with five samples of the salts, manufactured by different firms and purchased on the open market. The samples were marked I-II-III-IV-V and the methods applied for estimating the purity were the following:

I. Process similar to the U. S. P. method for estimating morphine in opium: —.85 gm. of the morphine salt is dissolved in 15cc. of water, and the solution is mixed with 7.5cc. of alcohol, 15cc. of ether and 2.2cc. of ammonia water. The mixture is then shaken for ten minutes and allowed to stand over night. The crystallized morphine is collected on a filter, washed with etherized water and dried at 60° to constant weight.

II. Puckner's Method:—(Journ. Amer. Med. Assn., Sept. 13, 1913)—.5 gm. of the morphine salt is dissolved in 20cc. of water and mixed with 0.25cc. of ammonia water, the mixture is shaken for five minutes and allowed to stand over night. The morphine is collected on a filter, washed with morphinated water, dried at 60° to a constant weight. To the amount of morphine found .0076 gms. is added, the amount of morphine soluble in the aqueous liquid.

III. Nitron Method:—.35 gms. of the morphine salt is dissolved in 50cc. of water and mixed with about 5cc. of a 10 *per cent.* solution of nitron in 5 *per cent.* acetic acid. After allowing the mixture to stand in a refrigerator for two to three hours it is filtered through a Gooch crucible and the precipitate is washed with ice water (using not more than 10cc. of the latter) and dried to constant weight. The weight multiplied by .93 gives the amount of morphine nitrate, according to the equation:—

$$\underset{\text{Nitron nitrate}}{C_{20}H_{16}N_4HNO_3} = \underset{\text{Morphine nitrate}}{C_{17}H_{19}NO_3HNO_3}$$

IV. Schäfer Method:—(Amer. Journ. Pharm., 1913, page 439.)—.85 gm. of the morphine salt is finely triturated in a small mortar with a sufficient quantity of purified sand and an excess of sodium bicarbonate. The mass is moistened with a little water and allowed to dry again at a temperature not exceeding 30° to 40°. The mixture is then transferred to an Erlenmeyer flask, and to the con-

* Scientific Section at Detroit.

tents of the flask a freshly prepared mixture, consisting of one volume of methyl alcohol and four volumes of chloroform is added, and the mortar is carefully rinsed with the same liquid. The mixture is allowed to stand for one hour with moderate but frequent shaking. The liquid is then filtered through a small filter and the residue washed thoroughly with three to four portions of about 10cc. each of the above solvent. The combined filtrate and wash-liquids are distilled off, the residue taken up with an excess of N/20 sulphuric acid and the excess of the acid titrated in the usual way using cochineal or methyl red as indicator.

V. a. Isobutyl alcohol-chloroform method.—.5 gm. of the morphine salt is dissolved in 20cc. of water, the mixture made alkaline with sodium bicarbonate and shaken out with 50cc. of a mixture of equal parts of isobutyl alcohol-chloroform. The chloroformic solution is drawn into another separator and the aqueous solution shaken out twice more with each 30cc. of the above chloroform-isobutyl alcohol mixture. The combined alcohol-chloroform solutions are shaken out once with water in order to remove any suspended alkali and are then shaken out with 20cc. of tenth-normal sulphuric acid, followed by two portions of 20cc. each of water. The combined aqueous solutions are then titrated with standardized alkali in the usual way.

V. b. As an alternative process 0.5 gm. of the morphine salt was dissolved in 20cc. of water, the aqueous solution made faintly alkaline with ammonia and then shaken out as just given with various portions of a mixture of isobutyl alcohol-chloroform. The combined alcohol-chloroform solutions were then evaporated in a vacuum and the residue titrated in the usual way.

VI. Vanderkleed Method:—(*Journ. Amer. Pharm. Assn., Aug.,* 1913.)—A solution of the morphine salt equivalent to about .2 gm. of morphine is dissolved in 15 cc. of water in a separator, the solution mixed with amyl alcohol, made alkaline with the ammonia water and heated on a steam-bath at 80° for about five minutes. The mixture is then shaken for about two minutes and, after allowing to cool, the aqueous layer is drawn off into a second separator and the amyl alcohol transferred into a 300 cc. Erlenmeyer flask. The aqueous solution is extracted twice more with amyl alcohol in the same way. The combined amyl-alcoholic solutions are evaporated in an oil-bath to dryness. (We have found evaporating solution in a vacuum gives better results.) The residue is dissolved in 20 cc. of N/20 sulphuric acid and the excess of acid is titrated back with N/20 potassium hydroxide solution, using methyl red as indicator.

VII. Buchbinder Method:—.3 gm. of the morphine salt is dissolved in 30 cc. of lime water; to the solution .5 gm. of ammonia chloride is added and 30 cc. of a mixture consisting of two parts of chloroform and one part of alcohol by volume. After shaking the mixture well, the chloroform-alcohol solution is drawn off into another separator and the aqueous solution shaken out with various portions of the chloroform until the latter no longer takes up morphine. (We have found that even by extracting the aqueous solution ten times with chloroform not all the morphine is removed, but that only about three shakings are necessary, when chloroform containing about 10 *per cent.* of alcohol is used for the extraction.) The combined chloroform-alcohol solutions are evaporated to dryness, the residue is dissolved in 10 cc. of neutral alcohol and a convenient excess of N/50 sul-

phuric acid is added. The alcohol is then evaporated and the acid solution titrated with N/50 potassium hydroxide, using either cochineal or methyl red as indicator. The results given below were obtained by using a chloroform-alcohol mixture throughout.

In order to determine the accuracy of these methods we applied them to pure morphine, which had been obtained by recrystallizing the alkaloid several times from the alcohol. When titrated the alkaloid showed a purity of 100.0 *per cent.* and 99.7 *per cent.*

The results obtained with pure morphine, the samples of morphine nitrate and morphine acetate are given in the following table:—

	U. S. P. Process	Puckner Method	Nitron Method	Schafer Method	Isobutyl alcohol-chloroform Method		Amyl alcohol Method	Modified Buchbinder Method
PURE MORPHINE								
		96.6%		100.3%	98.2%		98.6%	98.7%
		97.6		102.5				98.2
MORPHINE NITRATE.								
I.	85.9%	87.9	87.1	97.4	84.8	88.04*	86.4*	83.5
				95.7				
II.	88.0	86.5	87.2	90.8	82.9	88.5*	85.2*	86.6
				93.6				
III.	90.7	88.7	90.9	92.2	88.0	86.8*	83.4*	86.7
				92.2				
IV.	87.8	89.9	89.6	92.6	89.7	84.7*	86.3*	86.4
				93.2				
V.	87.0	88.5	89.3	90.8	87.5	85.8*	84.2*	86.3
				94.5				
MORPHINE ACETATE.								
I.	95.46	93.5		121	99.8		101.3*	96.8
II.	90.63	86.8		108	97.8		98.1*	92.2
III.	92.19	93.5		112	93.8		97.7*	93.8
IV.	93.08	92.6		113	93.8		97.2*	95.7
V.	91.41	88.0		117	97.0		98.4*	94.3

* These results were obtained by evaporating the solutions of the morphine in the immiscible solution to dryness in a vacuum.

From these experiments it is evident that the purity of morphine nitrate rarely is above 90 *per cent.* and that the purity of morphine acetate is also far below 100 *per cent.* The latter is the more surprising as every sample exhibited a strong odor of acetic acid. If there is a loss of acetic acid, the percentage of morphine in the sample should be above 100 *per cent.*, provided the sample originally showed this purity.

In view of these facts it would be advisable for the Sub-Committee on Organic Chemicals of the Revision Committee of the U. S. P. to take this matter up, give requirements for a certain purity of these salts and furnish at the same time a reliable assay process.

By all the methods given in this paper the total alkaloids present in the morphine salts are determined. It is a well-known fact, that morphine sulphate and

most of the other morphine salts contain a considerably large amount of other opium alkaloids. These by-alkaloids should be determined also, inasmuch as they are ether-soluble and may seriously interfere with the estimation of morphine in mixtures with other ether-soluble alkaloids such as atropine, etc. This can easily be done by the isobutyl alcohol-chloroform method, as has been shown by one of us a short time ago.—*(Deutsch-Amerikanische Apotheker Zeitung, Jan., 1913.)*

Analytical Laboratory Sharp & Dohme.

THE COMPOSITION AND ASSAY OF HEROIN HYDROCHLORIDE AND DIACETYL-MORPHINE HYDROCHLORIDE.*

R. T. HARRIS AND A. M. CLOVER.

Upon assaying certain preparations containing heroin hydrochloride, it was found that the amount of alkaloid was about 5% less than that supposed to be present, and upon going further into this matter it was shown that the direct assay of heroin hydrochloride, by the same method, gave a similar result. The method of assay was then tested upon the base, heroin, and upon diacetyl-morphine which had been purified by recrystallization and the result of these tests showed that the method was entirely reliable. Heroin hydrochloride is referred to in the literature in all cases which we could discover, as the anhydrous salt of diacetyl-morphine, this being the formula assigned to the product by its manufacturers. A like state of affairs exists in regard to the hydrochloride of diacetyl-morphine, but on the contrary we find that heroin hydrochloride contains 1 molecule of water. Two samples of diacetyl-morphine hydrochloride, obtained from different manufacturers, were found to have the same composition, while another sample from a third source consisted of the anhydrous salt. On account of the close scrutiny to which pharmaceutical products are frequently subjected nowadays it is well to clear up such confusion by careful experiments and to call attention to the existing facts.

Heroin Hydrochloride:—When heroin hydrochloride is heated at 100° there is a decided loss in weight. Quantitative experiments are difficult to carry out owing to the readiness with which the resulting product absorbs moisture from the atmosphere; however, the loss in weight is no more than that resulting from the loss of 1 molecule of water. The substance is not changed in any of its essential characteristics and dissolves completely in water after heating. When the heated product is allowed to stand in the air for a few hours its weight reverts to exactly the original value.

Ten grams of heroin hydrochloride were dissolved in about 150 cc. water and precipitated carefully with diluted ammonia, until a slight excess of the latter had been used. The crystalline precipitate was filtered upon a Büchner funnel, washed free from ammonium chloride and dried. The combined filtrate was shaken out twice with a little chloroform and the latter solution evaporated until the solvent had been completely removed. The crystalline precipitate amounted

* Read at Scientific Section, Detroit.

to 8.4 grams to which is to be added .1 gm. extracted with chloroform. The theoretical amount required for the anhydrous salt is 9.10 gms.

The above experiment was repeated with another sample of heroin hydrochloride which melted at 225-230° (uncor.). From 10 grams there were obtained 8.55 grams of heroin which melted at 169°-170° (uncor.) and .15 grams were extracted with chloroform.

Five grams of heroin melting at 169°-171° (uncor.) were dissolved in dilute hydrochloric acid, just enough acid being used to effect solution, the volume being about 125 cc. The solution was then precipitated carefully with ammonia and the precipitate and extract obtained exactly as from the hydrochloride. The dry precipitate amounted to 4.88 gms. while the extract yielded .1 gm. additional. There had been practically no loss.

1.53 gms. heroin were treated on a watch-glass with about .4 cc. of concentrated hydrochloric acid and stirred quickly. The heroin goes into solution completely and this is soon followed by a separation of the hydrochloride. The product was placed in vacuum to remove water and a slight excess of hydrochloric acid. When dry, it was pulverized and again placed in vacuum until a constant weight had been shown which was 1.77 gms. This is slightly in excess of that required for a hydrochloride containing 1 molecule of water.

Diacetyl-Morphine Hydrochloride:—This substance was prepared by the action of acetic anhydride on morphine and was purified by repeated crystallization from benzol until there was no further change in the melting-point which was 170°-171° (uncor.).

Eight grams of pure diacetyl-morphine were dissolved in a slight excess of dilute hydrochloric acid, and then precipitated with ammonia in the same manner as has already been described under heroin hydrochloride. The dried precipitate amounted to 7.88 grams.

A quantity of pure diacetyl-morphine was dissolved in about seven times its weight of dry benzol and treated with the calculated quantity of a saturated solution of hydrochloric acid in absolute alcohol. After standing one-half hour a large proportion of anhydrous diacetyl-morphine hydrochloride crystallized out. The crystals were filtered upon a Büchner funnel, washed with water-free benzol and dried. They melted at 131°-135°, which is considerably higher than the melting-point of heroin hydrochloride. This product did not show any loss in weight when it was heated at 100°. It lay in the air for several days without change in weight, but when a portion of it was powdered, there was a small increase of weight during the first twenty-four hours, followed by a rapid absorption of water sufficient in amount to correspond to one molecule. Nine grams of this salt were precipitated with ammonia in the usual manner and there were obtained 8.02 grams of precipitate and .11 grams of extract. The theoretical amount required for the anhydrous salt is 8.19 grams.

One and five-tenths grams pure diacetyl-morphine were treated on a watch-glass with a slight excess of 15% hydrochloric acid. The resulting product was freed from water in vacuum, powdered with a glass rod and then again placed in vacuum until a constant weight was obtained. The increase in weight was .2216 grams, while the monohydrated salt requires theoretically an increase of .2220

grams. The salt produced in this manner melts lower than the anhydrous salt and also lower than heroin hydrochloride. 218°-224° (uncor.).

Three samples of commercial diacetyl-morphine hydrochloride obtained from different manufacturers were examined. (1) The sample melted at 230°-238° (uncor.). Ten grams gave 8.91 grams of precipitated alkaloid and .11 grams extracted. 9.02 grams were recovered while the theoretical for the anhydrous salt is 9.10 grams. The product was therefore the anhydrous salt. (2) The sample melted at 224°-228° (uncor.). From 10 grams there were obtained 8.6 grams of precipitate and .12 grams of extract. The product is therefore the monohydrated salt. (3) The sample melted at 225°-230° (uncor.) and showed a decided loss in weight when treated at 100°. It is therefore the monohydrated salt.

Since the completion of these experiments our attention has been called to a statement by Schaefer (*American Journal of Pharmacy*, 82, 220), that only the monohydrated salt can be found on the market. He found that this salt when dehydrated, regains its water quickly from the air, but we have shown that this is not true of the anhydrous salt which separates from solution.

Assay:—Heroin or diacetyl-morphine may be accurately estimated by dissolving in excess of 1/10 normal hydrochloric acid and titrating the excess of acid with 1/50 normal sodium hydroxide using cochineal as an indicator.

	Weighed Sample.	Found.	Found Per Cent.
Pure diacetyl-morphine.....	.1362 grams	.1354	99.42
	.1735 grams	.1725	99.44
Heroin.....	.1323 grams	.1317	99.53
	.1336 grams	.1328	99.41

For the estimation of the alkaloid in its salts the following method is recommended:—An amount of the preparation representing at least one-tenth gram of the alkaloid and contained in 10 cc. of solution is treated with 20 cc. chloroform and sufficient 10 *per cent.* ammonia to render it slightly alkaline. After shaking vigorously, the chloroform is drawn off into a container suitable for titrating. The extraction with chloroform is repeated three times, after which the combined chloroform extract is evaporated. Add 5 cc. of 1/10 normal hydrochloric acid or sufficient to completely dissolve the alkaloidal residue then add a few drops of cochineal solution and titrate the excess of acid with 1/50 normal sodium hydroxide. The results obtained are very close to the theoretical.

Scientific Laboratory of Parke, Davis & Co.

THE GLANDS OF INTERNAL SECRETION AND THEIR IMPORTANCE AS THERAPEUTIC AGENTS.

CAREY PRATT MCCORD.

The animal body, it appears, manufactures its own drugs. These drugs are the derivatives of the glands of internal secretion. These substances elaborated by the secretory cells of these glands are discharged into the circulation and carried to the various parts of the body. There they react upon the tissues in a manner for the well-being of the body as a whole.

The glands of internal secretion regulate and correlate some of the body's most important physiologic functions and constitute efficient protective and defensive measures against disease. There are, influenced by the glands of internal secretion, such functions as ovulation, pregnancy, muscle tonus, vaso tonus, secondary sexual development, adiposity, skeletal growth, sugar metabolism—on through an extended list. Despite the complexity and intricacy of these manifold manifestations of internal secretory activity the balance is maintained, in health, —in perfect harmony,—that is, the glands regulate and control each other. This interrelation, and interdependence of the glands of internal secretion have given rise to the term "internal secretory balance." Although these several glands are situated in the body widely apart from each other and have no visible connections one with the other, they constitute a unified system of glands, every individual of which having its function or functions, but contributing to the maintenance of a complex interrelation within the entire system. It is now established that there exists not only an organic and functional harmony between all glands but a compensatory interaction as well. Every gland acts, in its peculiar functional manner, upon the blood passing through its tissues, often adding to it bodies of vital importance to the welfare of the individual. If any organic disease or abnormality exists in a particular gland, the missing or altered function appears in some cases to be taken over by some other gland, and disaster is prevented. In other cases the altered metabolism of one gland upsets the normal metabolism of all the others and leads to its impairment and the impairment of the body as a whole. In its deepest significance, it is probable that every cell in the body is a potential ductless gland and has some slight influence on the life and functions of its fellow cells. The terms "ductless gland," "gland of internal secretion" and "endocrinous gland," are, however, restricted to these organs showing glandular tissue and yet having no ducts for discharging the formulated substances.

The tissues producing internal secretions are, pituitary, pineal, thyroid, thymus, parathyroid, pancreas, adrenal, ovaries, testes. There are, in addition, some indications of internal secretion from the tonsils, placenta, and carotid gland.

Glands of Internal Secretion and Disease:—While the ductless glands functionate for the maintenance of the normality of the body, they themselves are subject to disease and traumatism. In many instances, apparently as a prevention against traumatism, the ductless glands are so located that the very shielded and privileged situation of these organs suggests a vital importance. The pituitary gland resting in the saddle of the *sella turcica* of the sphenoid bone at the center of the skull is the best protected organ of the body. Scarcely less protected is the pineal gland near the center of the brain, the parathyroids embedded in and behind the thyroid gland deep in the neck, or the adrenals padded in the fat above the kidney. The removal of the glands experimentally, by accident, or through necessary operative procedures, manifests the absence of the gland by distressing and even fatal symptoms. The removal of the adrenals, for example, leads rapidly to the death of the animal or patient with great prostration and depletion before death due to the loss of the adrenal function of maintaining muscle and vascular tonus. The removal of the parathyroids leads to death from the accumulation of toxic bodies in the circulation, the destroying of which is

the parathyroid's function. The removal of the pancreas leads to diabetes and later to death. Not all glands, however, are immediately essential to life. In adult life the testes, ovaries or pineal gland may be removed without producing any fatal results.

It is not necessary that there be a visible anatomical destruction of the ductless gland to produce a perversion of its secretion and thus a disturbance of the body's equilibrium. They are subject to tuberculosis, to cancer, to infectious diseases, that may lead to a slight or grave impairment, which may manifest itself as an increased or a decreased function. Increased function of the pituitary gland leads to gigantism, acromegaly, while decreased function produces obesity. Increased function of the thyroid causes goitre, while decreased function causes the coarse featured obese cases called "myxoedema," and in young children is termed "cretinism." Even so mild a condition as the so-called "spring fever" may be a condition of decreased adrenal function. All considered, it is very evident that malfunction of these glands may produce very severe pathological states of the body, and it becomes a pertinent matter to inquire as to the efficacy of treating such conditions with preparations of glands derived from cattle, sheep or other animals.

Ductless Glands as Therapeutic Agents:—The conception of using animal derivatives in treatment is by no means new. As early as 6000 B. C. preparations from testes were given in the treatment of obesity. At about the same time there are also mentioned the use of such other animal substances as "swine's fat, dog's dung, fat of a serpent, hair of a virgin goat, and human bone." It is only a step from this, to our present-day desiccated *corpus luteum* and pituitary extracts. It is, however, a far cry from the ancient to the modern point of view regarding such substances. The ancients used these agents, calculating that their vile tastes and nasty odors would drive away the offending disease, while, by us, organ derivatives are employed from our knowing that chemical substances are elaborated and stored by the organs and when given off into the circulation promote the welfare of the body organism. This rational use of glandular derivatives is only 25 years old, but, in these comparatively few elapsing years, a vast amount of work has been performed by scientific workers everywhere, until to-day we are confronted by a bewildering literature filled with contradictions, over-exploitations, speculations and theories, but, fortunately, here and there we find a clear-cut, undoubted fact that stands as a monument of human achievement.

Unrestrained speculation from the very incipiency of organo-therapy has attached stigma to this form of treatment. There has always been the over-optimistic type of worker who has held out greater virtues, as the properties of certain glands, than really existed as facts. Extravagant claims have actually retarded the fuller understanding of the possibilities and limitations of glandular therapy. So, let us recognize that we are surrounded both by existing limitations and by ignorance as to possibilities. Let us at once learn not to expect any panacea that will rejuvenate old men, or which will defer old age beyond a certain physiologic limit, nor can hopelessly anatomically defective minds be brought up to par. On the other hand, nearly every gland has its field of application. In many cases, the application is specific, and neglect to use glandular tissue approaches criminality. Persistence in the treatment on the part of the

physician is essential. Most of the glands, apart from such products as adrenalin and pituitrin, act so as to alter the metabolism. Such changes do not occur at once. For instance, no good results are to be expected from placing a mentally defective child on pineal medication for two weeks. Such treatment must be continued for months and even years.

One of the sources of error accountable for poor results may be ascribed to the chemical manipulation of glandular substances, with the desire to purify them and ultimately to obtain the active constituent in crystalline form. A chemically pure substance, active and freed from attending deleterious qualities due to contamination, is, of course, very desirable, but many glandular products are not standardizable and a mechanically nice-appearing product may be attained at a sacrifice of activity. Except in a few instances, adherence to a product closely simulating the original tissue, is attended with better results, in the absence of any direct data regarding the nature of the substance stimulating the changes. This is especially true of such obtuse agents as the anterior lobe of the pituitary gland and the pineal body.

Very few of the hormones have been isolated in crystalline form, so that, for the most part, the properties of these hormones of the different glands are but meagerly understood. In general, they are the chemical means of correlation of the activities of the different parts of the body. They promote or moderate metabolism. In addition, special functions are attributed to some. Even with so vague a knowledge of the nature and properties of hormones, it is possible to indicate some lines on which with safety we may proceed in the application of these glandular derivatives. They are likely to prove useful in five different ways:

1. The most obvious and natural use is in the treatment of the diseases due to destructive lesions of the glands by which the hormones are secreted. In this substitution treatment glandular derivatives are used in a sound and rational manner. Typical of this use is the employment of *corpus luteum* or ovarian extract in the treatment of artificial menopause due to the removal of the ovaries.

2. Glandular derivatives are serviceable when there is bodily demand for more secretion than the gland supplies. For example, the simple parenchymatous goitre of young women is due to overgrowth of the gland in its effort to supply a greater amount of the thyroid secretion. When such patients are placed upon thyroid medication, these simple goitres in many cases disappear.

3. The derivatives of one gland may be substituted in a deficiency of activity in another gland. For example, where osteomalacia is present and attributable to ovarian malfunction adrenalin preparations are many times useful.

4. A large number of conditions exist where glandular products are beneficial but no connection is established between the pathologic condition and the gland function. Such may be called the "empiric use" of glandular derivatives.

5. The use of these glandular derivatives as drugs, for example pituitary extracts as an oxytocic, or adrenalin as a hemostatic.

In the foregoing pages I have tried to make clear the importance of the glands of internal secretion in health and normal function, the possibility of disaster that may come to the body through perversion of secretory function from disease or traumatism and, in the last paragraph above, it has been my desire to point

out the rationality of combating disease and aiding normal functions by the administration of preparations of these glands. Since the cells of the various organs may be influenced in their functioning by substances procured from other animals, the possibilities at once opened up are immense. Progress to the ultimate control of many complicated conditions, is limited only by the capabilities of the scientific workers to produce satisfactory preparations of established and uniform activity.

This is an all too brief outline of hormone therapy to-day. New pathways in this field of therapy are opening up yearly. The principles of hormone therapy explains in many respects the action of the older drugs and affords solid groundwork for future methods of treatment. For these reasons I commend the glands of internal secretion to your further interest and study.

VOLATILE AND ODOROUS CONSTITUENTS OF HUMAN URINE.

At ordinary temperatures the amount of volatile acids in urine is very small, and the characteristic odor is not due to them, as has been stated. The lower fatty acids occur in such minute traces in normal urine, and are present in salts or in combination, so that they can only slightly, if at all, modify the odor. Sulphuretted hydrogen is given off by all urines, in the cold, when they are treated with dilute phosphoric or sulphuric acid. The volatile substances were obtained by acidifying a large volume of urine with sulphuric acid before distillation. Benzoic acid, derived from the hydrolysis of hippuric acid, was the principal volatile acid found, although in many cases the hydrogen sulphide present was sufficient to account for the total acidity. Fatty acids up to heptylic acid, and possibly hexahydrobenzoic acid, were also present in minute quantity. Phenol and paracresol were present, also notable quantities of higher phenols. Methylamine and indole occur in traces in fresh urine; the amount of these bases increases on fermentation. None of these are responsible for the characteristic odor of urine. This is due to a neutral substance, urinod. It was obtained by acidifying 1,000 litres of urine with sulphuric acid, allowing it to stand for several days, distilling, shaking out the distillate with ether, and removing the acids, phenols, and bases from the ether extract by the usual methods. The residue was then distilled, the distillate again shaken out with ether, the ether extract being shaken with mercury to remove sulphur. The purified ether residue was then fractionated *in vacuo*. Urinod was thus obtained as a yellow oil, slightly heavier than water, in which it is insoluble, with a very persistent, penetrating odor of urine. A drop on a filter paper retained its odor for fifteen months. Its empirical formula is C_6H_8O; boiling point, 108° C. under 28 mm., or 208° C. under normal pressure; but it does not distil under ordinary pressure without decomposition. It is very volatile in aqueous vapor. Urinod is extremely poisonous; its relation to metabolism is not known. It may have some influence as a cause of uræmia. Oxidising agents at once destroy it; hence these are best for use for deodorizing urinals.—W. M. Dehn and F. A. Hartmann (*J. Amer. Chem. Soc.*, 1914, 36, 2,118, 2,136).

Section on Commercial Interests

Papers Presented at the Sixty-Second Annual Convention

THE SALE OF BIOLOGICALS.

WALDO M. BOWMAN.

"The present is the perpetually moving spot where history ends and prophecy begins. It is our only possession; the past we reach through lapsing memory, halting recollection, hearsay and belief; we pierce the future by wistful faith or anxious hope, but the present is based on fact."

So says a modern writer and we do not gainsay him truth, yet we build to-day with hope for to-morrow. The past is past—What of the future?—What of to-day?

It was 118 years ago that the practice of vaccination against Small-pox was introduced and some twenty years ago that Anti-Diphtheritic Serum was first marketed, but it is during the last decade that the greatest advances in Serum Therapy have been made, and our Biological Materia Medica has been so greatly enlarged by the various Serums, Bacterial Vaccines, Phylacogens and Sensitized Vaccines that are coming to play such an important part in the practice of medicines that when the physician of to-day is called upon to prescribe for his patient his mind turns in many instances to Biological Materia Medica for the remedy.

This being so, it behooves the pharmacist to be thoroughly informed, not only as to the different biological products, their distinguishing points, methods of production, usage in the treatment and prophylaxis of disease, but the methods of best preserving them in active condition and commercially of the most effective ways of bringing them to the attention of the physicians and the public.

That comparatively few pharmacists are keeping up to date on this rapidly changing line is an admitted fact, and failing to be posted they are naturally unable to take care of the demand that may be made on them for biological materials. The elaborate and expensive plants and complex methods necessary to the production of Serums and the modern Bacterial Vaccines makes it obligatory for the manufacturer to depend for distribution, and the physician and public for supplies on the dispensing pharmacist or other local source of supply, we should therefore be prepared to meet the demand for this class of material which affords a good margin of profit and for which the user naturally looks to the pharmacist.

Let us briefly mention the various Biologicals with their distinguishing points. Diphtheria Antitoxin is the only one at present official in the Pharmacopœia. Its method of production is fairly well understood. In the twenty years that it has been in use, the mortality from Diphtheria has been greatly reduced, danger of epidemic lessened and to-day its use is the first thought in this disease, and Diphtheria has ceased to be the universally dreaded scourge it was. Tetanus

Antitoxin and the Anti-Bacterial Serums, Anti-Streptococcic, Anti-Pneumococcic, Anti Meningitis, Anti-Dysenteric, Anti-Anthrax are all produced in a manner similar to Diphtheria Antitoxin by developing in horses by repeated injection of either a toxin or bacterial culture a high degree of immunity, the blood serum from these animals after purification representing the marketed product. Normal Serum, the purified serum from the blood of healthy horses is used in the treatment of Hemophilla and has quite an extensive sale.

Small-pox Vaccine marketed in capillary tubes and glass or ivory points is the original Biological; its method of production is doubtless familiar to all of us, and commercially this product is of considerable interest.

Bacterial Vaccines are the product of Bacterial cultures on a suitable media, they representing commercially either the solution of the product of a specific organism, or of several combined varieties, their medicinal value lying in their property of raising the resistance power in the body to infection; that is to stimulate the Phagocytes that nature provides for fighting infection. The principal commercial varieties are Acne, Coli, Diphtheria (for immunity), Neisser (Gonococcic) Pneumo, Staphylococcic, Streptococcic, Typho and various combinations of these forms.

Phylacogens are "Sterile aqueous solutions of substances generated by bacteria grown in artificial media," they are, substantially, mixed bacterial vaccines, those bearing a specific name showing a preponderance of the named organism, the principal varieties are Mixed Infection, Gonorrhoea, Rheumatism, Pneumonia. Their use medicinally is similar to that of Bacterial Vaccines, they following Shaeffer's theory that in all infection, the growth of all forms of pathogenic organism is stimulated and to successfully combat disease all forms of infection must be combated.

Sensitized Bacterins, marketed as Serobacterins, are prepared after the method of Besredka, by bringing live bacterial cultures on artificial media, into contact with the blood serum of an animal which has been previously rendered immune to the specific infection; that is, one whose blood has been heavily charged with antibodies, a precipitate is formed which is freed from adhering serum, purified and killed mechanically, an aqueous mixture with suitable preservative representing the commercial product. They are used medicinally in the same way as Bacterial Vaccines and Phylacogens; the claim being made that they produce quicker and more lasting immunity with less reaction, the marketed forms are practically same as the Bacterial Vaccines. Tuberculins, for diagnostic and therapeutic use, are produced from cultures of the Tubercular Bacillus. They are marketed in various forms both concentrated and dilute and are largely used by a limited number of physicians.

Various cultures of the Bacillus Bulgaricus both in liquid and dry form are becoming important commercial products; following the theory of Metchinkoff of Paris they are used in the treatment of various conditions due to intestinal infection, cultures are also marketed for the production of buttermilk, the use of which is along the same lines.

That it is manifestly impossible for the pharmacist to carry in stock all of these items is evident, but the well-regulated stock should include in addition to Diphtheria Antitoxin and Small-pox Vaccine, Normal Serum, Anti-Streptococcic

Serum, Tetanus Antitoxin, Anti-Meningitis and Anti-Pneumococcic Serums and an assortment of Phylacogens or Bacterial Vaccines, including Acne, Gonococcic, Streptococcic, Staphylococcic Typhoid, both treatment and immunizing, and Mixed Staphylo Bacterin, the quantity to be carried must necessarily vary in different localities and should be regulated by the volume of business (that is, the number of people you might normally be called on to serve), and the distance from a dependable source of supply. It should be sufficient to care for a reasonable demand and where the source of supply is so situated that fresh stock can be obtained within twenty-four hours a representative stock might include in Diphtheria Antitoxin six packages of One Thousand Units, and two each of 3000, 5000 and 10,000. Twenty vaccinations against Small-pox and double this amount of all except the 1000 Unit Diphtheria Antitoxin should the source of supply be more distant.

Of Anti-Streptococcic Serum and Tetanus Antitoxin, six curative packages each should be carried. For in treating severe cases one package is used every six hours; two immunizing packages of these should be carried as well. A smaller amount of other Serums will suffice as will of the Bacterial Vaccines in which it is advisable to carry in stock the larger packages. After you learn your trade and have established a demand for these preparations, a little care and observance will enable you to keep the stock in good condition, but do not overstock vaccines, as in many instances the sale of a single package is all you may expect for a case under treatment. The manufacturers, in most instances, provide for exchange of unsalable stock, but with this material it is very easy to tie up an unnecessary amount of capital.

As to the best methods of preserving, the manufacturers of the various Serums and Vaccines have given a great deal of time to experiments along this line, the results of which show in what manner they may be best preserved,—that is, their activity retained for the longest period.—They should be kept in the dark, this is easily done as they are marketed in light-proof packages. These packages, also, in most cases, bear a date after which time they should be no longer sold. They should be kept at an even temperature preferably at 40° F. or thereabout, it having been shown conclusively that the rate of deterioration of Serums stored at this temperature for a considerable time is 16% as compared with from 30 to 40% at the ordinary room temperature, while the deterioration of Small-pox Vaccine is much more rapid, in warm weather, it often losing its efficiency in a few days, while if kept at a low temperature its activity is retained and at 10° F. it may be kept for a long period.

The rate of deterioration of Bacterial Vaccines and Phylacogens is still somewhat questionable and there is no doubt but that they retain their activity longer if kept cold. Temperature being such an important factor, it is advisable that all biologicals be stored in a refrigerator so constructed that the packages may be kept cold, dry and sightly and at the same time be readily accessible. One constructed entirely of metal or porcelain, is preferable and if properly arranged will keep your stock in good condition and may be made a valuable advertising asset; and also of use in storing other preparations liable to rapid deterioration such as Ergot and Digitalis preparations, Culture Media, etc. Personally, I have found a refrigerator of this kind a most valuable addition to store equipment.

Now, having a stock of Biologicals and providing for their being well stored, the question of sale is of paramount importance; during the first few years that Diphtheria Antitoxin was on the market, the use of it was confined principally to the specialists in diseases of the throat. Among the medical profession to-day its use is well nigh universal; all schools and classes of physicians resorting to its use when the opportunity presents itself. The newer Biologicals have been used until lately by comparatively few physicians, but the opportunity for business to-day, and in the future, lies through those physicians in general practice whose investigation along Biological lines is comparatively limited. These men are possible good friends of your pharmacy, their patients are your good customers and will turn to you for supplies. Be prepared when the opportunity comes to talk Biologicals to these men, study the literature on the subject that may be easily obtained from the manufacturers; read carefully the various articles that appear in the trade journals from time to time along this line and if the opportunity presents itself visit one of the larger Biological Laboratories where you can get the information at first hand, *get this information* so that when the opportunity comes to make use of it, you will not have to say "Well, I don't know much about that, but maybe I can find out," but will be able to identify the particular Biological that is needed for the case in question. Remember that the psychological factor in making a sale is an important one and that you must know the value of your merchandise before you can impress its value on another. I hear someone say, "We are not practicing medicine for the physicians, let them do that for themselves; we're in business to supply what is called for, not to tell what is wanted." Quite true, but neither are you practicing pharmacy for yourself unless you are thoroughly familiar with the composition and therapeutic value of the medicines and agents that are used to-day, and if your interests are Pharmaceutical rather than purely commercial, you will be up to the times. If not, you will be distanced by some more energetic fellow who has kept up-to-date and is willing to impart his knowledge when the opportunity is at hand.

Advertise Biologicals to the Medical Profession, informing them that you are carrying a complete assortment, stored under proper conditions, and that you know their therapeutic use. Advertise them too, to the public, for with the very considerable amount of publicity that has been given to Bacterial and Serum treatment of various kinds for the last two years in magazines and the daily press, the better read people have a more or less defined knowledge of Biologicals in the treatment of disease and will be attracted by your advertising a line of medicines that they know are coming into more extensive use continually.

Personally, I have used street car advertising with marked success, running for some time a card calling attention to my installation of a special refrigerator where biological products were stored under ideal conditions; asking inspection of it, and saying that these products were supplied only on physician's orders. Also a card on Anti-Typhoid inoculation for the production of immunity against Typhoid Fever at a time when this disease was prevalent. Use methods of this kind or well-worded newspaper advertising, coupled with window displays of dummy packages and display of attractive placards. Your good friend the "general public" is very amenable to suggestion, if it be timely and about something that is of interest; so advertise Vaccine when Small-pox is an epidemic. Typhoid

Vaccine when this disease is prevalent, Diphtheria Antitoxin at appropriate seasons and Tetanus Antitoxin before the Fourth of July.

The margin of profit is good and people will respond, your physician will benefit as much as you and if your advertising is dignified you can not be accused of overstepping the bounds of proper publicity.

When the demand comes to your establishment, see that you are there to take care of it or have some one who is equally well informed, don't let the junior do it all; but be awake when opportunity comes your way, for we are told that "she knocks but once at every door."

As to Autogenous Vaccines, that is, Bacterial Vaccines prepared from cultures of individual cases for the treatment of such cases, on account of the apparatus and time necessary for their production, these cannot be undertaken by the pharmacist with any degree of success, except in rare instances, but an arrangement with the larger manufacturers is available which will enable you to take care of any demand that you may have. Rabies treatments may also be taken care of in this way, and while these items do not afford a large percentage of profit, they are handled on a cash basis and you have no investment to make.

So far, we have considered only the Biologicals used in human practice. In the veterinary line there is a fertile field for those stores which are so situated that they are able to get in touch with the veterinary and farmer trade and to obtain business along veterinary lines, for a profitable trade can be readily established. They use Biologicals largely and the present indication seems to be that the horse is far from being displaced by the motor, while the demand for dairy biologicals continues to increase.

Tetanus Antitoxin in veterinary practice is highly successful and the use of immunizing doses of Tetanus Antitoxin is a routine procedure with the better veterinarians in all surgical cases. Anti-Streptococcic Serum has a very considerable demand, as has Veterinary Diphtheria Antitoxin. Among the Bacterial Vaccines, Mixed Bacterins of Polyvalent type, Pneumococcic, Streptococcic Bacterins and Anthrax and Abortive Vaccines and the various Veterinary Phylacogens are considerably used, while the demand for Tuberculin and Mallein is steady.

In point of quantity, Hog Cholera Serum is the largest item among Biological preparations, the amount used in some sections being enormous.

These items can be advertised to farmers and veterinarians and a very profitable business be secured with little effort where proper conditions exist.

Summing up the whole matter—If you are not developing the business in your territory along Biological lines you are neglecting a great opportunity for profitable trade.

Their use has shortened the duration of many diseases and practically eliminated others. It has decreased the need for ordinary medication to a marked degree and so curtailed your profits to some extent. What the development along these lines will be in the next decade we hesitate to predict, certainly there will be great advances and great developments. Be well informed and get the business in your field while it is developing, and keep in mind that saying "He who knows and knows that he knows is a wise man."

DISCUSSION.

Chairman Mason said that it had been his contention for a number of years that the future of the druggist was right along this line of biological products; that the materia medica is going to diminish in importance, and the future is in the direction of biological products. Chairman Mason said further that he was afraid that the American druggists have not appreciated this fact, and for that reason he had solicited these two papers on the subject, hoping that the authors would act somewhat as missionaries. The Chairman said if there were any others present who could give their experience in the sale of biological products, he would be delighted to have them do so.

Mr. Cornelius Osseward, of Seattle, said it had been his experience that biologics were getting less attention from the druggists than any other line that has recently been put in the drug-stores. He spoke of that because of the number of clerks he had recently employed, it had been his experience that everyone of them came to his store knowing nothing whatsoever about biological products, and the result was that he himself had to be "on the job" all the time, unless he got a man who would take enough interest in the subject to take it up and study it. It did not take much time for a man to become posted on the subject. It was a good line, and there was a good profit in it, and the druggist could get as much as forty per cent. plus his cash discount on the goods, and he did not see why the druggists do not take up that line more than they do. In his case he was somewhat at a disadvantage in that he was so far away from the eastern markets that he had to carry an immense stock, which made it necessary for him to have between twenty-five hundred and three thousand dollars invested in biologics. The reason for this was because the physicians insisted on goods made by different manufacturers, and this required carrying, sometimes as many as five different makes. This is a hardship, and it meant the investment of a lot of money that really was not necessary, with druggists who were close to the market. Where there was but one man in the city who handled biologics, he did not need to have more than one line because he was independent. In his case, there were five or six other druggists who handled biologics to some extent, which made it necessary for him to carry most of the makes which were on the market, which was the only disadvantage he claimed for carrying biologics in his vicinity.

Mr. Selzer said he used to handle serums, but, because the city now distributed it free, to rich or poor alike, as well as vaccine virus, he had discontinued doing so.

Mr. Holzhauer said, the Board of Health in his city, supplies biological products to rich and poor alike, and the Board has stations for their distribution in various drug-stores throughout the city. This was true of all the biological products with the exception of a few which are not in common use. The Board of Health had charge of the whole thing and the druggists simply acted as distributing agents.

Chairman Mason asked Mr. Holzhauer what the druggist got out of it, to which question Mr. Holzhauer replied that they got nothing, except glory. (Laughter.)

Chairman Mason then asked Dr. Charles T. P. Fennel, of Cincinnati, to explain why it is that any city Board of Health distributes free antitoxin to any one except the indigent.

Dr. Fennel replied that he was just going to say that the same conditions existed in Cincinnati with their Board of Health, and they had the additional misfortune of having a surgical instrument house in their city which catered to the medical profession, and offered them a twenty per cent. discount on their goods, with the result that the druggists who carried a line of surgical instruments, were placed at a disadvantage, and only had calls for these articles in the night time when the Board of Health and the surgical instrument house were closed, and consequently there was no profit in these lines in Cincinnati.

Mr. Holzhauer said, originally, in his city, the Board of Health provided antitoxin only for the poor, and the way the change was brought about to provide it to the people who were not poor, was by a gentleman coming into his store one night who had a child sick with diphtheria. In this case the culture had been sent to the Board of Health Station, and the report made that it was a case of true diphtheria. The gentleman on getting this report, wanted a bottle of antitoxin, but was told he could not have it as he was not poor. Mr. Holzhauer said he saw the ridiculousness of the position and he went to the Board of Health about it. As a result of this incident the Board of Health started their own department and developed along the line he had indicated.

Mr. E. H. Thiesing, of Cincinnati, said he would like to call attention to a few interesting situations which had existed in Cincinnati some years ago in regard to this very product; that the druggists woke up to the fact that they were selling no antitoxin at all; that the local association then took the matter up and after some investigation it was discovered that two firms in the city were delivering antitoxin to the physicians at the same prices that the druggists were paying for it, with a two per cent. discount; that the druggists finally decided to make an effort to have antitoxin of their own brand, and they got in touch with the Board of Health, and with their coöperation, the local association has made an arrangement with the Memorial Institute of Chicago, he believed, by which the druggists are now selling antitoxin in quantities of five thousand units for $2.25 to the public, against the former retail price of $7.50; that the association had in this way brought back to the druggists about eighty-five per cent. of the trade in antitoxin, whereas previous to the druggists making this arrangement, the sale was in the hands of two firms in the city.

Mr. Thiesing said he mentioned this because it might be advantageous to do this in other places. The antitoxin is now handled in his city through the local association, and is also being supplied to some small towns outside of the city, and they can sell it at this same price. He thought 3,000 units were sold at $1.50, and 1,000 at eighty cents. The arrangement had been quite an advantage to the public, and had brought back to the druggists the sale of the antitoxin, which they had not had for a little while. The arrangement had been brought about only through coöperation with the Board of Health, and each package of the goods was marked with the approval and consent of the Cincinnati Board of Health.

Mr. Holzhauer said they had at his store arrangements to receive diphtheria slides which went to the Board of Health, and in twenty-four hours the physician knew whether he had a case of diphtheria or not. Otherwise, the physician went on treating his case two or three or four days before he absolutely made up his mind whether he had a case of diphtheria. This was true with other diseases all the way down to tuberculosis. In a suspected case of tuberculosis, the sputum cup is used, and the sputum is examined, and in twenty-four hours the physician knew whether he had a case of tuberculosis.

He never liked to turn his back on anything that provided profit for the druggist, but it did seem to him that it was a case of doing the greatest good to the greatest number, and with the Board of Health managing this thing he thought it was a great deal better for the patients who were suffering from these diseases to have it under such control, rather than to have a physician "fool" along for a week before he made up his mind whether he had a case of typhoid fever, for example. As it was now, the physician knew inside of twenty-four hours, and it seemed to him, while he received less profit, still it was a great benefit to the community at large.

Mr. Selzer said in his city all the police stations furnished antitoxin, and the physician did not have to go down street to get it; that the police stations supplied it, and the physician did not have to tell what it was for.

Chairman Mason called on Mr. Leonard Seltzer, of Detroit, for some comments on this subject. Mr. Seltzer said he had not been able to determine how far the sale of biological products had been interfered with by the distribution of such products by the Boards of Health. The sale of such products has been somewhat interfered with, but he had not seen much interference, so far as antitoxin was concerned. He did not know, of course, how much he did not sell, but simply how much he sold. So far as the sale of biological products was concerned, it seemed to be only a good means of pulling other business. It was a good plan, in order to keep in touch with the physicians, to have a full line of biological products, and keep them in good condition.

Mr. Holzhauer asked Mr. Selzer how much he lost by deterioration? Mr. Selzer replied, he had never figured it out, but he did not remember of having lost a single package of antitoxin, although once in a while he had lost some of the others.

Mr. Bowman thought they were losing sight of one very important thing in this discussion; that the thing to do was to make the public believe that your own store keeps biological products in better shape than any one else in town. A certain number of people in every community knew who had the best goods, and they will come to you because they know your goods are all right, and you know what you are doing, and they do not know what kind of goods this Board of Health "stuff" is, particularly with the newer biologics. The druggist should put himself in such shape before the public that when they need any of these things, he will be the first man to come into their mind, and they will go to his store and buy them. It was good advertising to the public and that was the one great point in the sale of biological products.

Mr. Osseward agreed heartily with the last speaker, and said that the pharmacist should so conduct his store that the public would come to him. He further said that he had an incubator in his store, which the physicians use. They put their cultures in this incubator when they want to find out the nature of an infection, and, in the case of diphtheria, after the physician has left his culture, he comes back to the store and gets his culture before he goes to the patient. The physician makes his test, and the culture incubates in the store, and the next morning the authorities come around to the store and inspect the culture, and the physician gets the report and comes to his store, because there is where the culture was incubated. The incubator was one of the best investments he had ever made, it had cost him a hundred dollars, although you can get a small one for fifty dollars. It was because he had this incubator, that when the physician got his antitoxin, or his biologics, he came to him, as their store had the reputation of having everything that is on the market in the way of biological products.

Chairman Mason said he thought they had perhaps given sufficient time to this subject, and he simply wanted to say in concluding the discussion that both Mr. Bowman and Mr. Osseward of Seattle have made a brilliant success in the sale of biologic products, and that they have shown what can be done by giving some study and attention to the subject.

BUILDING UP TRADE IN SPRAYING MATERIALS.

H. F. RUHL, MANHEIM, PA.

The use of insecticides and fungicides is greatly increasing, not only in fruit growing but also in general farm practice. Wheat and other grains need to be treated (before seeding) with Formaldehyde solution to prevent smut. Wheat is treated in the granary or grain elevator with Carbon Disulphide to prevent a sort of a "miller" which destroys much wheat. Potatoes are soaked, before planting, in Formaldehyde or Mercuric Chloride solution to prevent scab. Potato vines are sprayed with Bordeaux Mixture to prevent blight, and with an Arsenate like Paris Green or Lead Arsenate to kill potato "bugs." The list might be lengthened, but even this short list shows the advantage of being prepared to supply a need that is bound to grow.

The essential requisite for building up a trade in this line is familiarity with the subject; knowledge of the necessary materials; strength of solutions; the right time of application. This knowledge may be acquired by reading Federal and State bulletins. In Pennsylvania, Volume 1, No. 1, of *The Bi-Monthly Zoological Bulletin* issued January, 1911, under the direction of Prof. H. A. Surface, covers the subject thoroughly. No doubt similar publications are issued in other states by the Experiment Station or Department of Agriculture. If possible, get into touch with County Farm Bureau Agents and successful fruit growers. If state officials give demonstrations in orchards, attend these.

One other essential is advertising. A pharmacist may be thoroughly familiar with the subject and have the necessary spraying materials and yet fail to do much business. By impressing upon possible customers the fact that he knows and has the goods, through the medium of advertising, will greatly increase his chances for success. The writer has used window displays in the fall by showing perfect specimens of apples with a placard "Plan to have fruit like this next year by spraying." No spray materials were shown. As the time for spring spraying approached spray materials were displayed. Newspaper space has also been used, giving directions for preparing solutions. After the edition of the paper was run off, the form was lifted out and placed in a smaller press and a quantity of counter slips run off. The wording of one of these slips was as follows:

FOR POTATO BLIGHT

Use Bordeaux mixture. Make stock solutions as follows:

Tie 25 pounds copper sulphate in a cloth bag and suspend just below the surface of 25 gallons of water.

In another vessel slake 25 pounds of lime and add enough water to make 25 gallons.

When ready to spray to make 50 gallons of mixture; take 5 gallons copper sulphate solution and enough water to make 45 gallons. Stir up lime mixture and strain 5 gallons of it into the 45 gallons above and it is ready for use. If bugs are present add two or three pounds of arsenate of lead and apply both at one spraying.

RUHL'S DRUG STORE,

Telephone 608 L. 51 S. Prussian Street, Manheim.

Such printed directions save the pharmacist time as no verbal directions need be given.

Most of the chemicals or drugs needed to supply this trade are carried in stock in nearly every pharmacy, hence there is no additional outlay. Only the fact that some of these, like sulphur and copper sulphate, are needed in large quantities makes it necessary to buy in larger quantities to get every possible price concession so as to be able to sell reasonably.

DISCUSSION ON THE ANNUAL INVENTORY.

Chairman Mason proposed as a topic for discussion the taking of an Annual Inventory.

MR. NITARDY:—"Our firm is a large one with a quarter of a million dollars of invested capital, divided into six stores, a supply department and a manufacturing-department. The inventory of all of these is taken in one day, each department looking after its own. The office supplies inventory-books, the pages of which are printed similar to an invoice. The pages of this book are torn out as filled and then they are bound in a large volume together. Thus we always have a definite sheet or series of sheets for each particular class of articles. Our inventory usually contains between fifty and sixty thousand separate items, that is for the main store, and this work is finished in a week's time."

MR. SCOTT, of Detroit:—"We take an annual inventory and we try not to exceed seven days in taking the inventory of our seven stores. We simplify the taking somewhat by listing the goods we make at a certain figure which figure they had found did not vary much from $10,000. This simplified the work and eliminated many objectionable features of it. The final figuring of the inventory is done by the office-force. The man who does not take an inventory does not know what he has in stock that is unsalable and which oftentimes can be exchanged for salable goods. An adding-machine we have found to be a very useful article in making an inventory. Much time can also be saved by massing certain things, such as, for instance, herbs. Taking an average price for such herbs, we find that we have one or two hundred pounds of herbs at a price of twenty-four cents a pound. This method saves detail. The same method can be adopted in the case of tinctures, elixirs and like goods."

The question being raised as to how depreciation of fixtures should be taken care of, Chairman Mason called on Mr. Barker to answer that question.

MR. BARKER:—"Soda fountains, carbonators and things of that nature depreciate about ten per cent. a year. Shelving and show cases about five per cent. Cash registers should be charged off at about ten per cent. It is well to allow a liberal depreciation on store fixtures, so that when changes have to be made they have already been allowed for."

In reply to a question Mr. Siebert stated:—

"I think it necessary, in the adjustment of fire-losses that the druggist should be able to state the actual cost of the articles for which he desires to receive compensation. To present an estimate of 'fluid extracts, so much' would not be acceptable to the present-day companies. That used to be the case, but companies have become much more particular regarding this. Many druggists do not take an inventory more than once in ten years and such men would find their case a difficult one if they had a fire in their establishments. The first thing asked for now by the companies is the inventory and if that is not forthcoming adjustments will be difficult. Annual inventories are absolutely necessary for prompt and satisfactory adjustment of losses.

MR. SHRINER:—"I have had a little experience with fire. The fire was caused by a person who had a position in my house, and as a result of it a garage burned down. The garage cost $5,000.00 and it was insured for $600.00 only. The fire insurance adjuster, who represented several companies, was a friend of mine, but when it came to adjusting the loss I found out that, friend or no friend, the adjuster wanted to know precisely about every item of loss. The insurance people looked the thing over and I was very much surprised at the system which they used in trying to make an adjustment to the satisfaction of their companies and the stockholders of the companies. The fire resulted in a total loss to me practically and I got my $600.00, but the insurance companies were not satisfied to simply measure every foot of ground; they wanted to know how large the building was; they looked at the charred remains and everything else, and I noticed that it was all written down in detail, and I admired the system. It opened my eyes.

"I have been in the drug business for about thirty years, and during those thirty years I have taken an inventory twice (laughter). I started to take an inventory nine years ago, and it took me six months to finish it (laughter), and when I finished, I had to commence over again because I had bought a whole lot of things in that time, and we had used a whole lot

out of the different containers. I tell you it was a proposition—it was a job! Everything was accurately measured. My son and I, we worked like beavers to get everything summed up. I said to my son, 'Al, get everything and mark it down so many quarts, so many gallons, and so forth. Let's start in and get graduates and measure it off.' So we measured it off, and after we had proceeded a while, I said, 'By golly, we are up against it, ain't we?' (Laughter.) And Al said, 'Well, you have got to know what you are worth here, you are always saying you never know what you have in this store.' Says I, 'Certainly we should.' 'You are getting all you want, ain't you?' 'Well,' says I, 'I wish we were through.' 'And just now you said I could go on alone and finish this job! I haven't had a Sunday for two months since this has been going on!' Well, my friends, that is all right. When it was all over, I was considerably pleased, for I found that I was worth a few thousand dollars more than I thought I was, and I said to Al, 'See what your father has done!' (Laughter.)

"I run my store upon the 'European plan.' Everything is alphabetically arranged, and there is not a thing in the house that I cannot lay my hand on, even in the dark, although another fellow might not find it so well, because they do not understand the system. There is not a shelf that is not arranged alphabetically. But I have noticed, sometimes, when I got a shelf mixed up a little, I had an awful time finding things again (laughter). You know, I would be using two or three bottles in making a prescription, and place them back on the wrong shelf (laughter.) Still, we haven't had much trouble in that way.

"But as I said, I hardly ever took an inventory, and this insurance gentleman said, 'Now, Mr. Shriner, how about that inventory?' I says, 'I took an inventory about five or six years ago.' He says, 'Do you think that would stand in court?' I says, 'I don't know, I can't tell you whether it will stand in court.' He says, 'It will never stand in court, if it was made six years ago. You must take an inventory every year and you must itemize these things, because when you are called upon, you are supposed to show what you had in stock, and you must be pretty sure you had the things in stock so that the amount of the loss can be determined.' 'Now,' says I, 'I am going to take an inventory right away,'—but I haven't done it yet. (Laughter.)

"As I said, I have been a druggist for thirty years, and I have never believed in mixing other lines with my drugs in these thirty years. I have kept exclusively drugs. They are the important things, and no side lines,—no candy, or anything. But my son has just graduated from college, and that is where the trouble begins. He came home one day, and there was a family gathering. I says, 'What does this mean, everybody being here; what is the matter?' You see, I commenced to 'smell a mouse' somewhere (laughter.) My wife says, 'Al has something to tell you; he has something he wants to talk over with you.' I says, 'He wants to stay with me doesn't he?' 'Sure, he wants to stay with you.' Says I, 'He wouldn't leave me now after I had educated him, and I have been sending him to school for so many years? I think I would like to get some help out of him.' And she says to me, 'Surely, but under a certain condition.' 'How?' And she said it again, more emphatic than before. 'Well,' says I, 'what is it?' And Al says, 'Well, you know the way you have been running this store.' 'Now,' he says, 'this won't do any more. It won't do to be in the back room all the time, and when somebody comes in the store, crawl out of that back room.' (Laughter.) Says he, 'This has got to be changed.' 'Changed?' says I. 'Don't argue with me,' says he, 'I am doing the talking.' Says I, 'What are you going to tell me?' 'Well, I will tell you, we are going to get a soda fountain.' 'A soda fountain,' says I, 'what do I want a soda fountain for? I suppose I will be going in the confectionery business next.' 'No use arguing about it.' 'Well, what else do you want?' Says he, 'And we are going to put in a line of candy.' Says I, 'Are you going to make a Huyler's store out of this place, what else do you want?' 'Get a high grade line of candy,' says he. 'What else do you want?' 'We want some kodaks,' (laughter). 'I never looked through one in my life,' says I, 'how could I sell a kodak?' 'I will do that,' says he, 'we will get them in stock.' 'Anything else you want?' 'Yes, we want a good line of paint.' 'Well,' says I, 'that is pretty near the limit, do you want to start a wholesale house?' 'Don't mind,' says he. And then mother spoke up, she says, 'Yes, you will have to do something. There is no use talking,' she says, 'you want to keep Al with you, and he is going to make this his life work.' Says I, 'Now let's talk this thing over. Where did you get all those foolish ideas?' 'Why, foolish ideas—' and he commenced to bristle up, and I was surprised. I never saw him with fight in him before. Says I, 'Is that what you learned in college?' (Laughter.) 'Now, look here,' says I, 'I want to conclude myself. We never want that kind of stuff, and we want to put in our time with pharmacy and *materia medica*, and everything else, and I never heard such kind of business from my professors when I went to school. I can't understand how you learned all this, and bring it up here in my own house, and expect me to go in and trade in different things I don't know anything about,' (laughter.) Says he, 'The times have changed.' 'Yes, I am very well aware of that, that the times have changed,' says I.

"Well, to make a long story short, what do you suppose I did? I ordered the soda fountain; I ordered some cameras,—a monkey business (laughter),—and I made a contract with a paint house, and got a high grade line of paints, and then I looked around for a high class of candy. Well, it is all right! (Laughter.) Then I did not stop at that. I took up all the fixtures that were in there and put them in the back room; all of those things with their glass covers,

and put them in the back room, and ordered new fixtures for the store. And here is the thing I want to talk about,—the old prescription case, that dear old friend of mine, always behind it, you know (laughter), and I had commenced to love it too, and that is a fact, but my son, with his new fangled ideas said it had to go, and he had made up his mind that he was going to have a prescription room. Oh, the times are changing! By golly (laughter)! there is no use talking about it!' My son said, 'I am going to make a prescription room in the rear, and it is going to have hot and cold water.' You know, I had never had hot water before in all my life in the store, always had cold water, but we have hot water now (laughter), and in this prescription room we are going to have nice shelves, all under cover, with all the chemicals, and everything else that is necessary for prescription use and we are going to have showcases from the top to the bottom,—going to do it up brown while I am at it (laughter). And behind this old prescription room there used to be a wooden partition,— my gracious! I will never forget the trouble that gave me when I had it torn down from the plaster and dirt, and everything else, and we are going to have an ice cream parlor there now (laughter). I have ordered five or six nice tables, with glass tops, so that everything is sanitary, and about thirty or forty chairs. I said, 'I am going to do this thing up right.' (Laughter.) I says, 'I have been operating under the old system for thirty years, but we will have the new system now.' Everything will be thrown out of the store, and we will put on new wall paper, and get new fixtures, and everything else, and get these dimmed lights that throw the light softly down from the ceiling. I am going to put them in (laughter).

"And talk about your sanitary business! I have given an order for a show window that will be closed entirely, and be made out of nice quarter sawed oak from top to bottom, so that no dust can get in there, and in the winter time, in case it gets cold, the window will always be clear, and now I am getting steam put in the building. The landlord kicked and kicked,—oh, didn't he kick. He said it would cost him $45,000.00 because he would have to put it in the whole block, as the other tenants would want it, and they won't want to pay any more rent, but after a while the tenants all agreed they ought to have steam and were willing to pay for it. So that little town is going to boom now, I tell you, and so far as that goes, I don't know whether I am going to make a success of it or not, but if I don't make a success, I am not going to worry. The goods are there, and we are going to sell them, and that is what my wife said. My wife, you know, is my partner in everything, only I haven't got anything to say. That is all. (Laughter.) But we want to give the boy a chance. She said, and I don't know, 'They say we ought to have these side lines in, and all like that.' And if we have got to have them, well, we will. It is a question to my mind whether they belong to the drug business or not. I have always considered the drug business as a profession, and not a commercial business, and I have spent many hours trying to do well to the public in general, and I may have done some good in my small way, but I can't do at all as I used to. Years ago,—twenty-five or thirty years ago, people would come to us, and ask our advice, and we would give them something that would help them, with very few exceptions. This thing is changed, and the doctors now prescribe for this thing and that, and people rarely go to the drug-store now. It seems to me as if the physicians controlled the public in general now and we are forced, without any doubt, to go into different lines. These are things we have got to think about, and think about very seriously, and certainly the best thing to do is to stock up on things that will sell, and will not lose their value, and will not spoil on our hands. This is a thing that ought to be given deep serious consideration. We drug men in general do not get together enough, and there seems to be a difference between them when a druggist meets a druggist. There is not the comradeship that there should be, and we do not greet each other with out-stretched hands as we ought to do. We are not kind enough to one another. There is something strange about it.

"I am sure that all the organizations should come together, even if we do not know each other. As long as we are druggists, and have confidence in each other as men, and as students of human nature, and so forth, we ought to talk to one another, and be kind to one another, and if we do that, we are going to succeed as well as is any other business in the country, and we are going to have coöperation, and we are going to have an organization that we can all get behind. We druggists should not be afraid to tell one another about our business, and what we are doing to a certain extent. We should be friends. Of course, there are all kinds of druggists, as well as customers, and we should be like contractors going after a job; if they don't get it, they try to get another one.

"My one hope and wish is that the druggists can be more democratic with each other, and that they will not slight each other as much as some have been. There is no reason why we as druggists should not succeed, and I hope that we will find some way of making a memorandum of our stock without the necessity of spending six months to do it. (Laughter and applause.)"

MR. SCHAFER:—"The question of inventorying drug-stores in detail is clearly an impossible one, without getting up something which is untrue and incorrect and which will not stand in the courts. The proper way to avoid this difficulty is to eliminate the clause in the insurance policy requiring the taking of an annual inventory and to insert in its place a distinct statement that such inventory is waived. Only one company had declined to accept a policy of

this kind and they formerly accepted such policies, discontinuing that practice about two years ago.

In order to meet the situation and in view of the fact that the National Board of Underwriters were experts in their line of business and knew the difficulties of making a drug-store inventory, I offer the following resolution:—

"That a Committee be appointed to take this matter under consideration and to have authority to present it tentatively to the National Board of Underwriters, for the purpose of getting some satisfactory clause in the insurance policies which would apply to the drug fraternity."

CHAIRMAN MASON:—"It should be understood by the Section that the motion if adopted would but express the views of the Section. The matter would then be obliged to go before the General Session for their action."

The motion was adopted.

DISPLAYING CONFECTIONERY AND COUGH DROPS IN BULK.

FRANKLIN M. APPLE, PHAR. D.

This is an age of intensive advertising, which includes displaying one's wares to the greatest possible extent, so as to catch the eyes of the shoppers and create in them a desire to purchase the goods exposed to view.

Whether it is proper or improper to thus display one's merchandise depends upon the nature of the goods, and the care taken to protect them from destructive or contaminating influences.

I am led to pen these lines by practices that have come under my notice, and by comments that have been heard concerning customs that are followed by some of those of our calling, as the intelligent, observing members of society of to-day are becoming more and more critical in their standards of cleanliness and hygiene.

It may be proper to display, unprotected from dust and dirt, such goods as are not intended for consumption by mankind, those which can readily be cleansed by using a brush or duster, such as building materials and supplies for stables, but to offer for sale in an unhygienic and uncleanly condition commodities intended for internal consumption by mankind, is a very reprehensible practice that will not fail to unfavorably react upon those merchants who so flagrantly disregard the health and interests of the public.

This is especially true of those of our calling, who are looked up to by the public as being possessed of greater knowledge concerning hygiene and bacteriology, and who are presumed to be a higher class of merchants than those who have no educational standards to respect or maintain.

From the March, 1914, issue of Huyler's Hints I will quote as follows:—

"People are very exacting as to what comes from a drug store; not only must the goods be of the best quality, but the packages in which they are put up must appeal to the sense of neatness. The dry-goods clerk, the shoe clerk, the grocer—in fact, salesmen in all other trades—do not care much about the appearance of the packages they send out. A sheet of paper twisted or rolled around the article, a piece of string, and the thing is done; and nothing better is expected. But with the druggist it is different. We wonder how many druggists appreciate the effect of a neatly-tied package or a simple, neatly-printed label, upon their customers. And yet we know of people who prefer a certain store to another for no other reason than that the goods sent out of it are neater than those coming from the other."

What has been most truly stated by this editor concerning the containers and

the labels for confectionery is unquestionably true concerning the confectionery itself, including in this class of merchandise medicated confectionery, known under the trade name of cough drops.

There has arisen a custom to offer for sale cough drops contained in a wooden box, which has no provision for protecting the goods from dust, dirt and filth, which method of displaying such goods should be made a misdemeanor, punishable by a fine for both the manufacturer of the goods thus displayed and the vendor thereof.

One manufacturer and distributor of cough drops, displayed in such a container, furnished by them, also offers for sale sponges packed in containers which are thus described:—"Packed in an attractive box with transparent top, suitable for counter display; keeps the goods on view and free from dust, etc."

This appears to me to be inconsistency of the highest type—protecting "from dust and etc.," a commodity that can readily be cleansed (and which usually is well-wetted before it is offered for sale, in order to add to its selling value), and sending out another commodity, intended for internal use, that cannot be cleansed before ingestion—and some of such goods that I observed on sale in drug-stores were so dirty and filthy that they were absolutely unfit for any use.

Upon interviewing the manufacturer of these cough drops, and directing his attention to this reprehensible practice, also calling his attention to the manner in which they packed their sponges, I was informed that it was impossible to pack the cough drops in a similar container, as the extra cost of the protecting, transparent cover couldn't be added to the cost of production, for the price charged for these goods was not sufficient to warrant any further addition to it, and competition compelled them to maintain their low price, as the retail druggists would not pay the small extra cost of the more sanitary containers.

Can it be possible that the true cause for this state of affairs lays at the doors of the retail druggists?

Are they not perfectly willing to pay the small extra cost of a cleanly container, if they want to make use of a box for displaying such goods?

I, for one, have refrained from handling these goods owing to the nature of the display container—and it arouses in one's mind a question as to the regard for the rules of cleanliness and hygiene observed in a factory sending out such goods.

It is argued that a large display, in bulk, of merchandise is very helpful in disposing of it. This may be true of certain classes of goods, sold in certain classes of stores, but when retail druggists consider this method of increasing their sales, they must not lose sight of the moral effect such a practice will have upon the minds of the public concerning their professional work, of which their neighbors can only judge by their observations of their commercial customs; and judging from comment made by some of our patrons concerning some proprietors and their methods of conducting their business establishments, the public is becoming more exacting critics of one's method of doing business than we suspect.

Another custom that is followed by a number of druggists is to fill their show windows with a large supply of jelly eggs about the time of Easter, allowing them to remain therein unprotected for weeks. As these goods are somewhat hygroscopic you can well imagine the magnet they make for dust and filth. Just stop for a moment to think from whence comes the material that is deposited upon

these confections, and I cannot believe that you would have any desire to eat any of such sweetmeats were I to offer you some at this time.

The windows have been stated to be the eyes of the store; and, by the public, are considered to be an evidence of the policies that direct the establishment; hence, when confectionery is observed in one's windows that is unfit to be used as a food or confection, what do you suppose is the opinion of the public concerning the remoter recesses of our stores, where their medicines are manufactured, compounded and dispensed?

The advantages of displaying wares in a cleanly manner has been observed by leading manufacturers in many lines of trade, as witness the improved methods of exposing cigars for sale, with their transparent, cleanly cover-plates attached to their boxes, and the display containers that constitute the fixtures of the up-to-date grocery-store.

In a recent conversation with the manager of one of a chain of over two hundred grocery stores, I was surprised to learn how much thought was given to the question of hygienic displaying of goods by the owner. He bids for and receives the patronage of the best class of trade that purchases its supplies at this class of stores—the result being largely, because of less sanitary methods being employed by the other competing chains of grocery stores, in one of which my informant previously labored. He noticed the advantage his present employer has over his competitors, soon after entering his employ, and had learned from customers the reasons why they give their patronage to his present employer.

The proprietor of a well-conducted hennery, appreciates the monetary advantage of a cleanly kept establishment; and the higher price he receives for his eggs if they are perfectly clean, with no evidences of filth or dirt attached thereto, makes him, automatically, an apostle of cleanliness and hygiene.

Inasmuch as we have a reputation as professional men to protect, it is incumbent upon us to take the initiative as business men to practice cleanly methods in displaying merchandise for sale to the public, thereby demonstrating our knowledge of and respect for hygiene and bacteriology; and it cannot fail to have a beneficial moral effect, leading the public to look upon us as a superior class of merchants to whom they will turn when in need of first-class, dependable goods.

I would suggest that we make it an unalterable rule to never sell any commodity to anyone in a condition that we would hesitate to accept as clean enough for our personal use; and if we make this humanitarian decision, we will not display confectionery or cough drops in a container unprotected from dust, dirt and filth.

Were we to view, with a high power magnifying glass, the character of the material that constitutes the dust that invariably is deposited upon all exposed goods, we would hold up our hands in horror, to think that we had been guilty of supplying cough drops and confectionery contaminated by such offensive material.

Kindly remember that the crusade to "swat the fly" resulted from a close study of the material that he carried from place to place, the offensiveness of which was not suspected until science told us the true tale.

Let us demonstrate that we are abreast of the times and prove the fact that we are firm believers in the old adage: "Cleanliness is next to Godliness."

DISCUSSION UPON THE PRECEDING PAPER AND HIGH GRADE CANDY AS A SIDE-LINE.—(Printed in September issue.)

MR. C. W. TOBEY:—"The two papers just read are very interesting and useful ones, but that although, as one of the authors said, 'Cleanliness was next to Godliness,' there is one thing I cannot understand about the candy business, and that is, if you take the ordinary candies and put them in a jar with a card stating the price, they will remain there until they are stale; while if you take a hundred pounds of the same candy and expose it for sale in one of these large, open pails, nine out of ten of his customers would say, 'Give me a dime's worth or a nickel's worth.' This shows that cleanliness is not always appreciated. In the cheap stores, where all kinds of candies are exposed to dust more candy is sold, a hundred times more, than is sold in stores that keep goods in a cleanly condition. Sometimes it seemed as though filth was at par. While I believe in sanitary methods, yet the people will buy the goods displayed in pails when they will not purchase those from jars. Therefore, the way to sell the goods is not the sanitary way."

MR. NITARDY:—"I think Mr. Apple's points are well-made and so was that of Mr. Tobey. There is a compromise between the two methods which our firm has adopted. We buy our candy in bulk and then place it in paper sacks priced at five and ten cents. These sacks are printed with the name of the article and the firm's imprint and price. These we place in trays near to the cash-register and when the customer pays his bill, he will often be attracted to them and buy one. We sell a large amount in this way."

MR. FENNEL:—"The public are not discriminating. They see this candy exposed in these cheap, department stores and they think it is good enough, but when they go into a drug-store they expect cleanliness and a better quality of goods."

MR. HOLZHAUER:—"I believe that the candy-business of the future will be done by the drug-store. The tendency is in that direction. Some time ago I placed in my store a wheelbarrow which I filled with horehound drops. The amount of these which I sold was something incredible. I bought them in five-barrel lots and sold tons of them in that winter. The only objection was that when the candy became a little discolored the loss was high, for people would not then purchase it. People not only want to see the candy, but they like to sample it. Concerning high-priced candy the attention of patrons must be called to it. It will not sell itself. Every druggist can make a good business in high-priced candy if he will devote attention to it."

CHAIRMAN MASON:—"It appears to me that the tendency of the last four or five years has been in the direction of higher-priced goods. In many cases it is the attractive package that sells the goods at a higher price."

MR. WEAVER:—"Mr. Mason is right about the package selling the goods in a great many cases. I do not really believe that the candy of the dollar package is much better, but it is more attractive to the young man who is going to present it to a young lady and wants something nice."

MR. APPLE:—"The particular point I wished to make was as to the unsanitary method of displaying such goods. We must not lose sight of the fact that primarily we are pharmacists and are expected to know more about the dangers of exposing goods to contamination. If pharmacists wish to be termed the hand-maid of medicine, we should, in every way, try to show that they possess a knowledge greater than that possessed by the ordinary tradesman. It would doubtless be very easy for a druggist to secure from their candy-dealers pails with a glass cover and this would protect them and keep them in a sanitary condition."

AN OPPORTUNITY FOR DRUGGISTS TO HANDLE INSECTICIDES, DISINFECTANTS, SPRAYS, ETC.

E. V. HOWELL.

The object of this paper is to present the opportunity of druggists in this line of work, and to lay stress on two points.

First. The commercial advantages of this field of work. Second. To show that *not* to take advantage of this opportunity is a *loss* to the profession in these particulars: First. Loss of the profit that may be derived from this trade; Second. Loss of *other* trade *because* this work, professionally belonging to the druggist, is taken up by others who then naturally add similar products and thus encroach on the legitimate field of trade of the druggist.

The manufacture and sale of insecticides, etc., involving as it does a knowledge of poisons, should be permitted to only those qualified by training and experience to dispense them. The fact that in a large number of cases only a small amount of an insecticide is wanted and that to avoid the trouble in purchasing and preparing this small quantity the public at large is willing to pay a handsome profit to those putting up the ingredients in small packages properly labelled with directions for making, gives the opportunity for *professional work* to the druggist and a profit besides.

For instance, Bordeaux mixture costs about one cent per gallon. If a druggist prepares a small box of powdered blue stone, and a small box of lime with directions for making Bordeaux mixture he can derive a profit satisfactory to himself and to his customer. From the formulas following you can see the advantages of small packages for this line of trade.

As to the second point, the disadvantages of not preparing for this work: In my state (North Carolina) we have to have an exception made in our Pharmacy Act to permit grocers, and general stores to handle non-poisonous domestic remedies. The continual protest of our druggists to this encroachment on their trade is to a large extent the fault of the druggist. First. Because they have not demanded sufficient education and training for their work to *compel* the public to recognize them as a profession. As an example of this fact, I may cite the statement that has been made; that a clerk in a grocery store is as well qualified to handle patent medicines, borax, salts, castor oil, etc., as the druggist with some experience at a soda fountain and four months of hasty preparation for a board examination which he passes, has to handle prescriptions, poisons, etc. This failure to properly train and educate our pharmacists certainly weakens our position in regard to demanding and defining a legitimate field for the qualified druggist.

Again, the druggists in my state neglected the opportunity of furnishing to farmers borax for curing their meat, at a small profit, copper sulphate for soaking their oats and wheat, saltpeter for curing meat, etc., Paris Green for tobacco worms, pepper for preserving hams, etc.

What has been the result? Not only a loss of the small profit on this trade but the serious situation has developed that grocers have quickly added these products together with a long line of allied articles and have thus become entrenched behind a wall of protection—"handles products that his customers expect him to carry."—It is from this fortified position, one given to him without resistance, that many of our druggists wish to dislodge him.

Not until the public is convinced that pharmacy is more of a profession will this effort to dislodge have any degree of success.

Right here it might be well said, that the argument that the drug business is 90% commercial and 10% professional does not annihilate or even affect the proposition of better professional training. The training and examinations are for public safety, and the 10% of this business or the 1% of that, must be safeguarded as rigidly as if all of our business was professional, for the 10% here and the 1% there when added up makes *all* of the part that must be safeguarded.

If the druggist does not attach this line of trade, the tree-doctor, the garden-doctor, the bug-doctor, etc. will arise in your section. He will and has a right to

take this trade if you don't want it. If by your neglect he engages in this work, at least do not then begin to make efforts to restrict, hamper or dislodge him from a field you wilfully or unthoughtfully abandoned. It does harm to your own profession at a late day to attack certain fields of trade that should have been acquired by exploitation, and not reserved by restriction. It is this class of legislative work that meets with resistance although there is merit in the general scope of the work.

It is hoped that these suggestions and the few formulas given will call attention to a line of work that I believe should fall to the druggist professionally and should offer an excellent opportunity for profitable business. In the following formulas, especial attention is directed to the point of putting up each ingredient in small, neat packages of just the amount needed for small operations. A rose bush needs spraying, have a package prepared that makes a gallon or so. The small cost and the convenience in making will attract many to the experiment of spraying the rose. With simple directions for making and a list of diseases and the spray suitable for such diseases prepared, we have an opportunity of doing *professional work* with a *good profit*, resulting in excellent advertising.

BORDEAUX MIXTURE.

Blue Stone	560 grains
Lime	831 grains
Water to make	1 gallon

Dissolve the Blue Stone in one-half gallon of water in one vessel, slake the Lime in another vessel and dilute with enough water to make half a gallon, pour them together simultaneously into a suitable vessel and a blue solution should be formed.

Cost.—Per fifty-two gallons, forty-one and a half cents. Per gallon, four-fifths of one cent.

Uses.—Apple Leaf Rust, Apple Scab, Bitter Rot of Apple, Black Rot, Downy Mildew, Leaf Blight, Anthracnose, Wilt, Powdery Mildew, Black Spot Canker, Brown Rot, Fruit Bloth, Leaf Curl, Black Knot, Flyspeck.

BORDEAUX MIXTURE WITH ARSENICALS.

Bordeaux Mixture	1 gallon
Paris Green	70 grains

Make the Paris Green into a thick paste with water and add to the Bordeaux Mixture previously prepared. Should be strained before being used.

Cost.—Per fifty-two gallons, fifty-two cents. Per gallon, one cent.

Uses.—Codling Moth, Common Asparagus Beetle, Cucumber Beetle, Flea Beetle, Picle Worm, Three-Lined Leaf Beetle, Squash Bug, Canker Worm, Gypsy Moth, Plum Curculio, Squash Vine Borer.

BED BUG KILLER.

Camphor	12½ ounces
Paraffin Wax	12½ ounces
Rape Seed Oil	25 ounces
Benzine to make	1 gallon

Mix them.

Cost.—Per gallon, 96 cents.

BISULPHIDE OF CARBON.

Uses.—The Black Grain Weevil, Common Bean Weevil, Pea Weevil, Augumois Grain Moth, Croton Bug, Fruit Bark Beetle, Grain Weevils.

KEROSENE EMULSION, WITH WHALE OIL SOAP.

Kerosene	85.3 ounces
Whale oil soap	2.6 ounces
Water	42.6 ounces

Dissolve the soap in the water by the aid of heat, then immediately add the kerosene, make Emulsion by churning.

Cost.—Per fifty-two gallons, $3.79. Per gallon, seven and three-tenths cents.

Uses.—The Harlequin Cabbage Bug, White Grubs, the San Jose Scale, the Scruffy Scale, the Oyster Shell Bark Louse, the Woody Aphis, the Onion Maggot, Apple Root Plant Louse, Chinch Bug, Grape Phylloxera, Grape Vine Leaf Hopper, the Hop Plant Louse, Pear Tree Psylla, Red Orange Scale, the California Live Oak Scale.

KEROSENE EMULSION, WITH IVORY SOAP.

Kerosene	85.3 ounces
Ivory Soap	2.6 ounces
Water	42.6 ounces

Shave the soap in thin pieces into the water. Heat until the soap is dissolved. Remove the heat and add the kerosene, then churn thoroughly. This makes a 66% Emulsion.

For 10% Emulsion, add 5⅔ gallons of water.
For 15% Emulsion, add 3⅓ gallons of water.
For 20% Emulsion, add 2⅓ gallons of water.
For 50% Emulsion, add ⅓ gallons of water.

Cost.—Per fifty-two gallons, $3.79.

Uses.—Used for the same insects as Kerosene with Whale oil soap.

LIME, SULPHUR AND SALT WASH.

Lime (unslaked)	6.4 ounces
Sulphur	4.8 ounces
Salt	3.2 ounces
Water to make	1 gallon

Slake the lime, then add the sulphur and salt and heat to boiling.

Cost.—Per fifty-two gallons, seventy-eight cents. Per gallon, one and a half cents.

Use.—Used in spraying trees before the leaves appear.

LICE EXTERMINATORS.

Naphthalin	3½ ounces
White Wax	1½ ounces
Cocoanut oil	5¾ ounces
Petrolatum	5¾ ounces
Oil Bergamont	1½ drams
Oil Cloves	1½ drams
Oil Cinnamon	1½ drams
Oil Lemon	50 minims

Mix the fats and add the Naphthalin, stir until the latter is dissolved, allow to cool, then incorporate the oils.

Cost for above formula, thirty-six cents.

MANGE CURE.

Whale oil	100 ounces
Sulphur	6 ounces
Tar oil	12 ounces
Crude oil to make	1 gallon

Shake well and rub once a day.

Cost.—Per gallon, sixty cents.

NAPHTHALIN SOLUTION.

Naphthalin	10 ounces
Oil of Lavender	16 ounces
Alcohol to make	1 gallon

Mix them.

Cost.—Per gallon, $5.07.

Use.—A lotion for Mosquito Bites.

PARIS GREEN AND WATER FORMULA.

Paris Green	48 grains
Lime (slaked)	48 grains
Water to make	1 gallon

Mix the Lime with enough water to make a thin paste and pour into half of the water, stir thoroughly. Do likewise with Paris Green.

Cost.—Per fifty-two gallons, eight cents. Per gallon, seven-tenths of one cent.

Use.—Army Worm, Asparagus Beetle, Apple Leaf Skeletonizer, Blister Beetles, Bag Worm, Celery Caterpillar, Celery Looper, Celery Leaf Tyer, Cotton Worm, California Devanting Locust, Elm Leaf Beetle, Irish Potato Beetle, Strawberry Weevil, the Cabbage Plutella, the White Cabbage Butterfly, the Cabbage Plusia.

POTASSIUM SULPHIDE FORMULA.

Potassium Sulphide	145.5 grains
Water to make	1 gallon

Mix them.

Cost.—Per fifty-two gallons, fifteen cents. Per gallon, three-tenths of one cent.

Use.—Red Spider.

RESIN WASH ADHESIVE.

Powd. Resin	1 pound
Concentrated Lye	3.2 ounces
Fish oil	5 ounces
Water to make	1 gallon

Place the Oil and Resin in one quart of water and boil until the Resin is thoroughly softened. Dissolve the Lye in a separate vessel and add it slowly to the Resin Mixture, stirring constantly until well mixed. Then add enough water to make the whole measure one gallon. Continue the boiling until the mixture will mix readily.

Cost.—Fifty-two gallons, $3.64. Per gallon, seven cents.

Uses.—With a few plants like cabbage and collards which have very smooth foliage, difficulty is often experienced in making poison mixtures adhere and for this purpose this mixture is used.

RESIN AND SULPHUR SOLUTION.

Sulphur	1½ pounds
Powd. Resin	580 grains
Caustic soda	1 pound
Water to make	1 gallon

Mix Sulphur and Resin and make into a thick paste with water. Dissolve the caustic soda in water and add to the first mixture, stir, after boiling ceases and the mixture has acquired a brownish color add half a gallon of water and stir well, finally add water enough to make one gallon.

Cost.—Fifty-two gallons, $5.94. Gallon, nine and a half cents.

Uses.—Red Scale, San Jose Scale.

RESIN LIME MIXTURE.

Resin Mixture	7.4 ounces
Milk of Lime	19.2 ounces
Paris Green	87.5 grains
Water to make	1 gallon

Add water to the Resin Mixture and mix thoroughly, add the Milk of Lime and then the Paris Green, previously made into a thick paste with water. This mixture must be freshly prepared when wanted.

Cost.—Fifty-two gallons, thirty-six cents. Per gallon, seven-tenths of one cent.

Uses.—Cabbage Webworm, Imported Cabbage Worm, Native Cabbage Worm.

SOLUTION ARSENATE OF LEAD.

Acetate of Lead	96.3 grains
Arsenate of soda	35 grains
Water to make	1 gallon

Dissolve the Lead Acetate and Sodium Arsenate each separately in three ounces of water in wooden vessels, then add water enough to make one gallon.

Cost.—Fifty-two gallons, sixteen cents. Per gallon, three-tenths of one cent.

SOLUTION MERCURIC CHLORIDE.

Bichloride Mercury	72 grains
Water to make	1 gallon

Dissolve the Bichloride Mercury in about one quart of water by the aid of a gentle heat, then add water enough to make one gallon.

Cost.—Per gallon, one cent.

Use.—Used to disinfect the knife or other tools in cutting out Pear Blight.

SOLUTION COPPER CARBONATE AMMONIATED.

Stronger ammonia water	1 ounce
Copper Carbonate	53 grains
Water to make	1 gallon

Make the copper carbonate into a thin paste with water and slowly add the ammonia water, then add enough water to make one gallon.

Cost.—Fifty-two gallons, $1.56. Gallon, three cents.

Use.—This insecticide is mainly used as a substitute for Bordeaux Mixture upon ornamental plants and maturing fruits as it does not leave the stain that Bordeaux Mixture leaves. It is also inferior as a fungicide.

Destructive to Powdery Mildew.

SOLUTION AU CELESTE MODIFIED.

Blue Stone	512.5 grains
Ammonia Water, 10%	3.2 ounces
Sal Soda	1.8 ounces
Water to make	1 gallon

Dissolve the Blue Stone in two quarts of water, add the Ammonia water and dilute with water to one gallon and dissolve in the Sal Soda.

Cost.—Fifty-two gallons, $2.60. Per gallon, 5 cents.

Use.—This wash should not be used on the foliage of stone fruits and should be applied to other growing plants only with due caution.

SOAP SOLUTION.

Laundry Soap	6 ounces
Water to make	1 gallon

Reduce the soap to fine shavings and dissolve by the aid of heat in one-half gallon of water, then add enough water to make one gallon.

Cost.—Fifty-two gallons, $1.95. Gallon, three and seven-tenths cents.

Uses.—Apple Tree Borer, Fluted Scale, Melon Plant Louse, Pear Tree Slug, Red Spider.

SOLUTION OF LARKSPUR AND BICHLORIDE MERCURY.

Fluidextract Larkspur	8 ounces
Bichloride Mercury	28 grains
Water to make	1 gallon

Mix them.

Cost.—Per gallon, $1.76.

Use.—Crab.

SOLUTION FOR ITCH.

Lime	1 pound
Sulphur	2 pounds
Water	1 gallon

Mix and boil one hour, then strain.

Cost.—Per gallon, nine cents.

To obtain the best results from the use of a fungicide, it is necessary that it should reach all parts of the plants subject to the attacks of the fungous parasites. Many devices for accomplishing this object are now on the market. All these fall within three principal groups, namely, knapsack pumps, hand pumps, and horse-power pumps. The knapsack pumps are designed especially for low growing crops, such as grapes. The hand-power pumps can be used in a number of ways and if strong and durable are probably the most useful of all the various styles of apparatus. The horse-power sprayers are designed to be drawn by one or more horses and operated by the same means. All these machines must be provided with nozzles that will furnish a mist-like spray and at the same time be easy to clean of any obstruction that may clog the necessarily small opening. There is no form of nozzle that so well fills these requirements as the Vermorel, which is now sold with nearly all spraying outfits. Where good labor is cheap and the crop is mainly grapes and low growing plants, the knapsack form of sprayer will probably be found as economical as any apparatus. For orchard work however, more powerful machinery will be required. Probably the most satisfactory form of apparatus for this kind of work consists of a strong force pump, mounted upon a barrel or hogshead. If mounted upon these, arrangements will have to be made to conveniently draw them through the orchards. The horse-power sprayers are nearly all complicated and expensive, moreover they can not be used satisfactorily under as many different conditions as the hand pumps mounted on suitable reservoirs. They may therefore, be dismissed with the statement that it is only in exceptional cases, as, for example, in case of an orchard of several hundred acres on level ground, that it will pay to use them.

With reference to the cost of the several kinds of apparatus mentioned it may be said that good knapsack pumps, complete in every detail may be obtained at

$10 each. The cost of a first-class orchard outfit should not exceed $25. Some kinds, in fact, may be fitted up for $10 or $12.

There are many farmers and many others who grow a miscellaneous line of fruits, such as a few grapes, pears, apples, etc.; in such cases it is desirable to have an inexpensive and effective apparatus that will answer for the various crops. The hand-pump which consists of a small force pump provided with a long piece of discharge hose and a cyclone nozzle. The whole outfit can be purchased and put together for $5, and will be found in every way superior to the many forms of syringes on the market. The pump is strong and durable and although small, it will throw a solid stream, the size of a lead pencil, for more than thirty feet. It may be used for trees of all kinds, as well as for vines and low growing crops.

I have clearly shown the preparation, use and cost of some of the most important insecticides. We know that insects do untold damage to the fruit and vegetable crops of practically every farmer in the country. Having shown that the cost is practically nothing and if insecticides are used they will save the farmers of the country a vast amount of money each year, it clearly follows that insecticides should be put within the reach of every farmer, and it seems to me that the druggists as a side-line and almost a part of his business is the one man above all others to supply this vitally needed remedy for the farmer. This naturally falls within the scope of the druggist and if he will avail himself of the opportunity of thus aiding the agriculturist, he will receive an abundant return.

THE ADVERTISING METHODS I USE.

HAROLD N. BRUUN.

It has been said, "the merchant or manufacturer who fails to advertise is very much like the bashful beau who throws his best girl silent kisses in the dark. He may know what he is doing, but no one else does." To know what one is doing is necessary, but to know why one is doing a certain thing, is of great importance.

In discussing my advertising methods, I will not dwell long upon the methods themselves as they are neither new nor original, but will endeavor to tell you my reasons for using them, which I believe will be of more interest to you.

I am located in a foreign neighborhood in a large city. A large percentage of my customers are illiterate. They are working people, employed in shops, factories and in heavy work. The average income of the family, according to J. W. Jenks and W. J. Lauck, in *"The Immigration Problem in the United States,"* is about eight hundred dollars a year. Their needs are simple.

The Problem:—What kind of goods are these people using now? What class of goods do they not use, but should use? How can I command their attention and interest them in my wares?

The Drug Store Paper:—This I use for the following reasons: The children of the foreigner attend school and the older people are eager to advance their

knowledge of the English language. These people do not subscribe for magazines and will more carefully peruse the drug-store paper, than the average American who devotes his time to reading the weekly or monthly publications containing stories by highly paid authors.

Window Displays:—These that attract attention require considerable thought and study. The average person goes along engrossed with his own thoughts and it takes something unusual to divert his mind from himself to the windows. We spend considerable time on this feature of our advertising.

Gifts:—At regular intervals we give away, with every purchase of twenty-five cents or over, a gift of some sort, usually a small bottle of perfume. This creates a feeling of friendliness and good-will.

Personal Advertising:—The biggest factor in dealing with this class, is what I would term, personal advertising. By this I mean the treatment of the customer while in the store. People who are ignorant and often poorly-clad, seldom receive courteous attention, therefore they appreciate it all the more when they do. We try to make our customers feel at home and treat them with consideration. I have impressed upon my clerks, that it is the customer who pays their salaries, the rent and my profits.

Special Methods:—One of the things my customers need, but few use, is a good tooth brush and a tooth powder. To acquaint them with their needs in this direction, I have printed small slips of paper in three languages, English, Polish and Italian. I dwell upon the necessity of keeping the teeth clean in order to preserve them, and save dental bills. By this means I am rendering them a real service and at the same time promoting the sale of my goods.

I believe in specializing on one preparation or product. In having something a little better than any one else, if possible. I give special care to the handling of cod liver oil, importing it direct from Norway. I see to it that it is always fresh and sweet. This I advertise as a leader, not in price but in quality, in the Scandinavian papers.

As you see my methods are neither new or startling, but I trust that my paper will be of interest to those engaged in the drug business under similar conditions, or to those engaged in the drug business under different conditions who have made a study of their possibilities.

WHAT IS YOUR BEST PAYING SIDE LINE?

FRANK RICHARDSON.

My best paying side line was for a long time taken as a matter of course and not much attention paid to it.

But after a time my attention was called to the possibilities in the cigar department, and I began to take notice, purchased a first class case with lots of moistening surface and a hygrometer, to keep me informed as to the condition of the atmosphere in the case.

Care was taken in selecting first-class brands at the various prices, and then we got behind the goods and began to "boost."

We were careful to keep the moisture in the case between 60-65 degrees, keeping the case tightly closed when not in use, consequently the stock is always in perfect condition and now we have the reputation of being the only store in town, whose stock is not all dried out during the winter time, this, of course, has helped the trade greatly and the cigar department has grown until it is the best paying side line in the store, doing nearly three times the business it did before. During the winter months, when your store is heated by artificial heat, cigars and tobacco must be watched very carefully and a certain degree of moisture (60-65) maintained in the case constantly, lest your stock dry out, lose its flavor and your trade go elsewhere, where the stock is properly kept.

I figure that my cigar department pays my rent, light and heat, and that is doing pretty well in a town of 1600 with 15 places selling cigars and one cigar manufacturer.

Too little attention is paid to this department in the average store, the stock is purchased, placed in the case and no further attention given it except to hand out the goods when called for.

Cigars are very sensitive to artificial heat and quickly dry out and lose their flavor and can not be brought back to their original condition. A little thought and attention will prevent this. In the first place get a good tight case, with plenty of moistening surface, place a hygrometer in it, and then see to it that the moisteners are filled at least once a week or as often as the hygrometer falls below 60 degrees, and keep the case tightly closed when not selling from it.

Have variety enough to suit all classes of customers, and endeavor to learn the likes and dislikes of your customers.

When you put in a new brand show it up and pass out enough samples to start a demand for it.

In a community such as the one I live in, special sales and premiums do not pay, but by careful attention to keeping stock, giving good value, and a pleasant word to the customer any one can largely increase the trade in this department, without adding to the expense account.

EFFICIENCY AND A NINE HOUR DAY.

C. A. WEAVER, PH. C.

In taking up this subject of shorter hours for the Retail Druggist, I have been led to believe, from an experience of some twenty-eight years, behind the counter, that the working of long hours was an unnecessary hardship that could be easily avoided.

This paper is written from the view-point of the so-called "two-man" drug store, comprising a registered proprietor, and one registered clerk, which I believe, constitutes about 60 per cent. of all the drug stores of the United States—stores doing a business of from fifteen to thirty thousand dollars a year. The smaller amount representing the two-man store, with the limited territory and

little effort, and the twenty to thirty thousand dollars, the busy, "get-there" store, with a larger field, and a more pronounced effort to build up trade.

Starting some twenty-eight years ago, as errand boy in a drug store, I naturally inherited the then prevailing hours of 7 a. m. to 10 p. m., with one night and one afternoon or two nights and part of every Sunday off.

It seemed only natural to fall into this rut, as all drug stores were conducted on very much the same plan and any scheme for shorter hours at that time would have been pure heresy.

My experience of the first eighteen years resulted in my coming to the following conclusion, that the drug business with its long, nerve-wracking hours, was not worth its remuneration, especially if a probable loss of health were considered.

It was quite natural then, at this time that I decided to forsake the retail for the manufacturing end of the business, the latter offering every opportunity for the continuation along lines of work, for which my education had prepared me, at the same time diminishing the hours of labor to a point where rest and recreation, so absolutely necessary to a man's health and efficiency were in evidence.

Despite the fact that the relief from long hours was fully obtained, after one year I accepted a position as manager of the store in which I had formerly clerked, having come to the conclusion that the retail drug business offered a greater opportunity, over the manufacturing, for the individual, and with the firm conviction that a scheme of hours could be evolved in which greater results would be obtained by concentrated effort, over a period of eight or nine, rather than a weakened effort extended over fifteen or sixteen hours, as formerly.

At this time I was fortunate in having the services of a very good clerk, who felt very much as I did in regard to the long hours devoted to the accomplishment of a given amount of work. So after considering the requirements of our store, we decided the work could be done to better advantage in shifts averaging about nine hours each, sometimes a little more, sometimes a little less. One week the clerk opening the store at 7 a. m., having one and a half hours for dinner, and leaving at 6 p. m., myself coming on at twelve, noon, having one hour for supper and closing at ten p. m.

We also worked but six days a week—one week having all day Saturday and the next week, all day Sunday off. This was the only hardship that went with the arrangement, as it necessitated having our meals in the store one day each week, but as it gave us one whole day for recreation, we were glad to overlook this slight discomfort. This Saturday and Sunday work has been varied and changed from time to time up to the present moment.

This scheme of hours was continued for some seven years, and still appeals to me as the more desirable one, as the hours of labor are continuous. Individual requirements, however, necessitate various modifications, for instance at the present time, we are working in divided shifts—one man working in the forenoon and evening of one day and the morning and afternoon of the next day, which gives each man every other afternoon and every other evening off. This plan, like the preceding one, provides for about nine hours in the store each day and has been in operation the last three years.

To say the original scheme was a success is putting it mildly. It was a pleasure to see that clerk come in at noon of the days he was to work the late

shift—to see him get into his store coat, and then notice the work fly. It disappeared like magic. This man was not tired out, he was not filled with the toxins of fatigue—he was "Johnny-on-the-Spot"—he had a new toy—he had the pleasure of labor, with the time for play coming, also the time for rest, and plenty of it in sight.

The clerk and I knowing it was a test case, naturally started out to make it a success, and we did. The work of the store was never so well or quickly done. Detroit at this time was just on the rise, and our business grew by leaps and bounds, without seemingly to disturb or very much overwork us at any time.

Efficiency is the order of the day. It is not how long we work, but how much we accomplish in a given time. I believe a man can do about so much work in a day, and from experience, believe this amount can be accomplished in eight or nine hours of industrious labor. If your labor be extended over a much longer period, a slowing down, a lack of "pep" and a general loss of efficiency will follow.

For a time the work *may* be done, and possibly as well, but at what a foolish cost, when at least one-third of the time might have been spent away from the store.

To-day, when I hear a druggist complain of the confinement and long hours of his business, I know he must be at fault personally. He either does not work long hours, or applies himself only half-heartedly, at the time he is supposed to be on duty. The latter is undoubtedly the main trouble. He has no regular hours for himself. He comes and goes when he pleases and is only governed by the clerk's time off. The store is on his mind when he is not there and he thinks he is working. Let him get right down to "brass tacks" for he is not "delivering the goods." He could not work for anyone else in the slip-shod way he works for himself, and what excuse a man can offer for giving himself poorer service than he would render others, is "too deep" for me.

Give yourself and your clerk the benefit of shorter hours and then see that you devote those hours entirely to work. *You* are the one to set the example for your clerk—you are the measure by which he plans his work.—Set him an example by being prompt and industrious in your hours of labor. Visiting, standing around unoccupied, reading the newspapers, etc., never brought a man anywhere in this world of business, with its keen competition demanding your attention every minute. Hustle a little—get all the work finished for once and strive to keep it so, by systematic effort. The appearance of your store resulting in more and better business, will repay you beyond your fondest expectations.

That the unfavorable impression too often given customers by a clerk or even a proprietor, in grudgingly leaving a story or magazine, to half-heartedly wait on them, should be eliminated entirely from our stores, there can be no question, and undoubtedly shorter hours is the solution. Read more, play more, rest more away from business, but work more, strive more, accomplish more during your hours of labor.

Druggists may argue that locations of their businesses, etc., may make this short hour scheme out of the question, but my contentions to the contrary are based on the fact that my personal experience covered two neighborhoods vastly different from each other, and in each the resulting success was the same.

Many imaginary obstacles may arise, in the minds of the individual, as he endeavors to apply the shorter hours to his own business, but experiment will convince the most skeptical that this is one of the problems of the drug business that can be most easily solved.

In summing up, I would have you thoroughly appreciate the fact, that this is not merely a suggestion or theory, but my personal experience of short hours in the past ten years of my business life.

Any druggist can demonstrate the practicability of shorter hours to his entire satisfaction, if he will but make a determined start, necessarily with the co-operation of his clerk and help in general, along the lines of systematic labor.

Isn't it really worth the while when a better-kept, and "up-to-the-minute" store naturally producing more business, is the result, while at the same time, health and recreation are not sacrificed, but on the contrary, are a direct outcome of the whole scheme?

Surely you will find that much of the weariness and dissatisfaction with our work, which we as employers experience, and much of the unrest and shifting around of our clerks will disappear.

TREATMENT OF WOUNDS IN WAR.

A striking fact observed in the treatment of wounded in the present war, whether on land or sea, is the great prevalence of sepsis. In the author's own experience, all the wounds he had seen so far were septic, some of them very badly so. Tetanus and acute spreading gangrene are also common, though tetanus has not yet been seen in the naval wounded, and this can be understood when it is remembered that the tetanus bacillus reaches wounds from the soil. The prevalence of sepsis in the large wounds is possibly to be accounted for by the length of time which may elapse after the injury before the patient comes under treatment. As to the treatment of this class of wounds, the author lays it down as an axiom of practice that if the treatment can be carried out within the first twenty-four hours (and, in the case of wounds soiled with earth, forty-eight hours) an attempt should be made to kill the organisms which have entered the wound. For this purpose, chemical antiseptics are probably the only means available, and in this connection there are two important points to be taken into consideration—namely, to kill actively-growing bacteria, and also the spores of bacilli. A saturated aqueous solution of carbolic acid (1 in 20) will kill naked, actively growing bacteria in a few seconds, but will not kill spores with certainty under twelve to fifteen hours. Liquefied carbolic acid, however, will kill spores in a very few minutes, and this must be used for wounds soiled with earth. Carbolic acid is an anæsthetic, and its application causes very slight pain, which subsides almost immediately. But iodine, though practically of the same antiseptic power as carbolic acid, has a number of disadvantages, one of them being the great pain it causes, this lasting for a considerable time. Therefore, the author prefers carbolic acid to iodine not only for the disinfection of the skin, but also, and more especially, as a means of destroying the bacteria which have already entered wounds before they come under the care of the surgeon.—*Sir W. Watson Cheyne, Bart.* (*Brit. Med. Journ.*, November 21, 1914, 865).

Section on Practical Pharmacy and Dispensing

Papers Presented at the Sixty-Second Annual Convention

ASSAYING GALENICALS.

JEANNOT HOSTMANN.

At the Nashville meeting, the writer contributed a paper on "The Necessary Apparatus in a Retail Pharmacy,"[1] which did not create much discussion. Since then, it has been both praised and criticized. Very little praise emanated from retail pharmacists but quite some criticism. The praise was usually bestowed by men not actively engaged in the retail business.

At the annual meeting of one of the state associations, the writer heard a member criticize the enforcement of the "Food and Drug Law" or rather laws, and was surprised when the statement was made that if retail pharmacists attempted to assay and standardize their drugs and preparations, the cost would be prohibitive.

"Are we druggists supposed to spend a thousand dollars for the equipment of an analytical laboratory, and then spend twelve hundred or more dollars per year to hire a chemist to run it for us?" This was his query. He did not, as I do not believe any progressive pharmacist would, deny that assaying and standardizing were absolutely necessary to the welfare of our profession; he simply, like many others, seemed to think it more important to attempt to standardize the price of "Brown's Cureall" than to raise pharmacy to a professional level in the eyes of the physician and layman by actually assuring himself by tests made in his establishment that the drugs he was selling and dispensing were really as represented.

Several papers have been read at various meetings during the current year, discussing the separation of the professional pharmacy from the commercial drug store. A paper will be read at this meeting in which the author recommends the formation of a national association of prescriptionists. All this shows the trend of thought of many thinking pharmacists, which no doubt will sooner or later bear fruit in placing pharmacy where it belongs, viz: A profession, whose first thought will always be to save human life and alleviate and prevent human suffering.

Martin I. Wilbert, in Reprint No. 189 from the Public Health Reports, after showing a summary of adulterated and sophisticated drugs collected during the time of one year, calls attention to the duty of pharmacy as follows:

"In conclusion it may be reiterated that the more evident shortcoming in the present-day enforcement of pure-drugs laws is the general failure to properly place the responsibility for the nature, kind and purity of the medicines supplied

[1] J. A. Ph. A., 1914, 697.

to the consumer where it belongs. This shortcoming is being corrected, to some extent at least, by recently enacted laws to regulate the practice of pharmacy by placing the responsibility squarely on the person dispensing the drug.

"The proper enforcement of laws designed to regulate the practice of pharmacy in conjunction with pure-drugs laws, should relieve physicians and the public of any doubt as to the composition, purity, quality and strength of all drugs and medicinal preparations used in the treatment of disease. As these laws are enforced at the present time it is plainly evident that the methods of control are inadequate and do not serve to safeguard public health as well as they could or should.

"Boards of health and other State and Federal officials intrusted with the enforcement of these laws should endeavor to call attention to the desirability of having druggists exercise a close scrutiny of the drugs and preparations included in their stock, to keep drugs, chemicals and preparations in suitable containers, to throw away old useless material, and to see that scales, weights, and measures are reliable and accurate under the conditions imposed upon them.

"Some effort should also be made to see that drug stores are equipped with the necessary analytical apparatus with which to analyze or examine all supplies and thus assist in maintaining a more efficient control of the articles sold as medicine.

"Consistent and efficient control of the identity, purity and strength of all drugs and preparations as furnished the consumer would make for progress in the science of medicine and should prove to be an important factor in promoting public health."

The United States Pharmacopœia presents the tests in such a way that any pharmacist who is a graduate of any good college of pharmacy and cares to employ the knowledge that he has gained as a student will have no trouble in determining whether the drugs and chemicals he purchases and dispenses and the preparations thereof, are up to standard.

If the pharmacist is a graduate of a college of pharmacy where pharmacy is taught as it should be, and employs only such graduates in his Prescription Department, he will not have to hire any chemist to attend to this class of work although it may be necessary for him or his employee to spend some of the time now spent in dressing windows, etc., in the laboratory.

The false ideas as to cost of equipment caused the writer to compile the following table which embraces the most important utensils needed to perform the necessary tests:

INVENTORY OF EQUIPMENT AND COST.

Volumetric Flasks.

2	100 cc.	.60
2	250 cc.	.80
2	500 cc.	1.40
2	files—rat tail	.20
2	files—triangular	.20
2	lbs. rubber stoppers	3.00
3	lbs. glass tubing	1.00

Flasks.

2	60 cc.	.20
2	125 cc.	.25
2	250 cc.	.35
2	500 cc.	.40

2	porcelain crucibles with covers	.50
3	triangles	.15
2	funnels—2″	.15
2	funnels—3″	.20
2	packages filters	.50
a	pycnometer	1.00
a	test tube rack	.50
1	dozen test tubes	.25
a	Bunsen burner	.30
3	ft. rubber hose	.25
2	100 cc. beakers	.20
2	250 cc. beakers	.30
2	3″ evaporating dishes	.24
2	2″ evaporating dishes	.20
2	60 cc. separatory funnels	1.50
2	125 cc. separatory funnels	2.00
1	water bath, 6″	1.25
2	burettes, 50 cc. in 1/10 with glass-cock	3.00
2	pipettes, 1 cc.	.15
2	pipettes, 2 cc.	.15
2	pipettes, 3 cc.	.20
2	pipettes, 5 cc.	.25
	Oven	5.00
	Desiccator	1.00
	Pt. Foil	.75
	Pt. Wire	.30
	Glass Rods	.15
	Microscope	75.00
	Balance	20.00
	Weights	3.50

Thus you will see it will cost about twenty-five dollars to buy the most necessary utensils, if the store is not equipped with a good balance, and many are not, why then twenty-five dollars more will buy the balance and weights from one milligram to one hundred grams. An oven and desiccator will cost six dollars more and, finally, a good microscope can be purchased for seventy-five dollars.

This comparatively small outlay will repay the pharmacist, who intelligently and faithfully uses the outfit after installation, many times over financially, as well as otherwise.

Columbia University, College of Pharmacy.

The value of the exports of perfumery to the United States from the consular district of Nice, France, decreased from $1,578,228 for 1913 to $755,671 for last year.

Editorial

ERNEST C. MARSHALL, Acting Editor..... .....63 Clinton Building, Columbus, Ohio

COMMERCIAL PHARMACY.

THE address of Governor Hammond of Minnesota at the meeting of the Minnesota Pharmaceutical Association, which appears in this issue, is most timely and interesting.

It should be read thoughtfully by every member of the profession.

As one entirely outside of our circle, he pleads with us to hold fast to the high standards it has always maintained and not to allow it to become entirely commercial. Mark you, this is not a cry from the past; from an old-time pharmacist, who wishes to see the profession restored to old ways and old manners. It is from a man of the present day; one not particularly in love with the past, but who is in immediate touch with the present, who has his eye to the rising sun. He tells us that commercialism is simply a cry for the dollar. That it is unworthy of us, and that we should strive to get away from that thought and build our profession upon broader and better lines, the lines which have brought to the name of Pharmacy dignity and honor.

It is almost to our shame that such counsel should be made to us from outside. Are we not intelligent enough to grasp the situation for ourselves? Has the time arrived when we cannot see the drift of things with our own eyes? Have we not wit and wisdom enough to appreciate the sacrifice of all that makes Pharmacy noble?

The opinion of Governor Hammond cannot be taken as a single view of a careless observer. It is the concrete expression of the opinion of the mass of the people. What he has said to us plainly and directly, the world is thinking and saying of us. The people are observant of the change in Pharmacy and they deplore the retrogression of the profession from a science to a business. No one who is good at heart but regrets and mourns at the self-ruin of a man;—then how much more would they mourn at the degradation of a class of men, who have advanced the world by their work along scientific lines.

It was not, and it is not necessary, to sink the scientific side of our profession in order to lift the commercial side. The latter has its place in our profession,—that no one will attempt to deny. But there is no need to sacrifice the art of Pharmacy, its very soul and inspiration, entirely to the commercial side.

As heartily as any one could desire we would like to see all pharmacists successful commercially, successful financially, all of them wealthy. But we cannot think that in order that they should be successful commercially, that they need to declare themselves non-professional, to relegate all the fixtures and stock which from time immemorial have marked the pharmacy, to a back-room limbo, and display only the articles belonging to the commercial side of the business; in fine, to

banish from sight all that makes a pharmacy distinctive, and to display only those goods sold in common with other stores without peculiar character. To deliberately throw away their scientific reputation and place themselves in open competition with other merchants who are without any technical training.

Develop the business instinct to its full, but do not sacrifice what is a valuable asset to you in so doing.

The sale of biologicals is more profitable than that of cameras or post-cards or magazines, and in that field there are fewer competitors, and in the handling of such articles you will make yourselves of more worth to the world and to your profession, and separate yourselves from the common business man.

Not that this will make you better than the common man,—not at all. Knowledge makes no man a better man than another. What one man knows more than another in one line, is compensated by what the other knows in another line. You can dispense a lot of quinine pills to a blacksmith, which it is impossible for him to make, but he can forge steel which you would find it impossible to accomplish. He can temper the spatula you use in making the pills and you cannot. So that the average of knowledge is in balance between you. That is his trade, and yours is that of a pharmacist, and as he is of value as a blacksmith and by reason of his knowledge of temper, of iron and of steel, of forging and of casting, so you are of value the more you know of drugs and chemicals, of percolation of solution, of compatibles and incompatibles. Commerce, yes, admit it all you please along your own line. Know whence your stock comes, its impurities, its adulterations, keep step with your rank, and be a PHARMACIST. In that way you will elevate and raise the profession of Pharmacy and make yourselves better, wiser and wealthier men.

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THE NATIONAL INSURANCE ACTS OF GREAT BRITAIN.

THESE acts (1911-1913) for information regarding which we are indebted to the Chemist's and Druggist's Diary, are to provide insurance against the expenses of sickness and loss of wages from unemployment, by persons earning not more than £160, ($800.00) a year.

It is, in effect, a compulsory insurance, to whose funds the employer, the employe and the government contribute; the employer paying from 3d. to 6d. (6 cents to 12 cents) a week; the employe from 1d. to 4d. (2 to 8 cents) weekly, while the government pays two-ninths of the male benefits and one-fourth of the the female benefits and in addition defrays all expenses of administration.

All workers employed are required to join an approved Friendly Society, of which the Chemist's Friendly Society is an example.

These societies furnish to their members a card upon which are spaces for the affixing of thirteen stamps. The employer is required to affix to this card every week a stamp, to show that the owner of the card has paid his assessment and the employer is authorized to deduct from the employe's wages the amount of the stamp.

The benefits paid in Britain are:

MEN.

1. Medical benefit; that is free medical attendance and medicine, or a money payment.
2. Treatment in a sanitarium in case of consumption.
3. Sick benefit; 10s. (about $2.50) a week for 26 weeks.
4. Disablement benefit; 5s. ($1.25) a week afterward if still incapable of work.
5. Maternity benefit; 30s. ($7.50) for wife on confinement.

WOMEN.

1. Medical benefit, as for men.
2. Sanitarium.
3. Sick benefit; 7s. 6d. ($1.87) a week for 26 weeks.
4. Disablement benefit, as for men.
5. Maternity benefit; £2 ($10.00) unless husband is insured. She is paid a sick benefit also after confinement.

The Medical Benefit comprises medical attendance and treatment, with provision of proper and sufficient medicines, and such appliances as are allowed by the Insurance Commissioners.

Every registered medical practitioner is entitled to admission as a panel-doctor and insured persons may select as their attendant any physician upon the list, within the area in which they reside.

Unless the insured person resides more than a mile from the nearest drug-store, the doctor does not supply the patient with drugs or appliances. For the supply of these, the Insurance Commissioners contract (1) with registered chemists and with limited companies, (recognized by the Poisons and Pharmacy Act, 1908,) to dispense prescriptions and to supply drugs and appliances; (2) with other persons to supply drugs and appliances, and (3) for the supply of appliances only.

To every panel-chemist is supplied a Drug Tariff or price-list of the charges he is entitled to make. This costs him 6d. (12 cents). It states (1) the prices he may charge for quantities from one-half grain or minim to one ounce of each article; (2) Names of articles whose cost is subject to fluctuations on account of the war, the prices of which are fixed monthly by agreement between the British Medical Association and the Pharmaceutical Society; (3) Rules for calculating prices not fixed by the Tariff; (4) Dispensing charges, and (5) Notes for dispensers.

The rules for calculating prices not fixed are very precise. For solids purchased in half-pound quantities or more, the pound cost is taken and divided by eleven, and this gives the Tariff charge for one ounce. This amount is divided by seven to find the charge per drachm, and that amount by fifty to find the charge per grain.

In the case of drugs purchased in small quantities (avoirdupois ounces), four-tenths of the cost is added to find the Tariff charge for a troy ounce, and this amount is divided by seven and the quotient by fifty as before, to ascertain the charge for a drachm and a grain.

For liquids, such as Tinctures, etc., where the sp. gr. is not greater than water, the listed price is divided by twelve, to get the tariff for one ounce; that, is divided by seven to ascertain the tariff for a drachm and that, by fifty to find the charge for a minim. For heavier liquids, such as Syrups, etc., the divisors are 9-7-50, respectively.

Dispensing charges are allowed upon all liquid preparations prescribed for internal or external use as medicines, but, in some districts, dispensing charges are not

allowed for extract of malt, fluid magnesia, glycerin, lime water, turpentine and certain fixed oils; nor is an emulsion fee allowed for cod liver oil or petroleum emulsions.

The dispensing charges allowed are as follows:—For preparations up to eight ounces, 2d.; over eight ounces, 3d; Stock mixtures, one-half this amount; for pills, capsules, lozenges or tablets not on tariff, for one dozen, 3d. (6 cents); and for each dozen or fraction of dozen extra, 1d. (2 cents).

For powders 1 to 6, 2 pence; 7 to 12, 3 pence; and for each dozen or fraction of a dozen extra, 1 penny; if placed in cachets, 1 penny a dozen extra. Suppositories, pessaries and bougies, not on tariff, for one-half dozen, 4d. (8 cents); a dozen, 6d. (12 cents).

A fee of 1 penny (2 cents) each is allowed for copying prescriptions. The charge for containers is fixed at 1 penny to 3½ pence, and these amounts are to be deposited by the insured person and refunded to him when the container is returned.

If a prescriber fails to justify himself in prescribing in an unnecessarily expensive manner, the excess cost of such prescribing is deducted from the next payment made to him. Extravagant prescribing may consist of (1) expensive items; (2) high general average cost of prescriptions, and (3) high average number of prescriptions per insured person.

Physicians are allowed to dispense only in emergencies and in such cases he is allowed 6d. (12 cents).

It is to be noted that the Board of Customs and Excise permit chemists to dispense methylated spirit in liniments or lotions prescribed by panel-doctors, the Panel Regulations stating that "When aconite, belladonna, soap and compound camphor liniments are ordered on National Insurance forms, methylated liniments are presumably intended and should be supplied."

When Aqua is ordered without further qualifications, ordinary water is to be used. If proprietary galenicals or chemicals are ordered they must be dispensed, —no substitutions are allowed.

The amount of compensation paid physicians seems to be largely in excess of that paid to druggists. The statement is made in the Pharmaceutical Journal that a physician having 1000 patients on his Panel will receive £300 ($1500.00) a year for his attendance.

The committees in some cases seem to be unable to pay the bills of the chemists promptly. One druggist informed the Glamorganshire Insurance Committee that unless they paid him his bill amounting to more than £100, ($500.00) he would be obliged to file a petition in bankruptcy, and in Liverpool it is reported the chemists are likely to have to face a deficit of about £5000, ($25,000.00) and in London the estimated deficiency was about £46,000, ($230,000.00).

From many of the other districts the reports were not favorable as to the operation of the laws and in most districts the payment of bills had been deferred.

Some trouble would appear to have developed in pricing accounts also, for in one of the Journals appear two advertisements of persons who will assist druggists to price their prescriptions properly.

It may fairly be presumed that under the regulations of the insurance act, none of the Panel Chemists of Great Britain will become millionaires from the results

of their activities under this act. The allowance for dispensing seems exceedingly low in all cases.

American druggists would not care to dispense two dozen powders for eight cents, or to make a dozen suppositories for twelve cents. Just what our British *confreres* think of the operations of this insurance is shown by the following communication to the Pharmaceutical Journal and is interesting, for it is possible that some of our legislators may attempt to introduce some such legislation into this country or into some of its political sub-divisions.

"But what does the pharmacist get? Suppose he receives a prescription for bicarbonate of soda—two drachms (he must know how this is prepared and what are the possible impurities); Liquor Bismuthi, four drachms (he must be acquainted with the method of preparation, with pharmacopœial doses, and with the principles of pharmaceutical testing); tincture of nux vomica, one drachm (the poisons schedule must be at his finger-tips, and the processes of maceration and percolation, and the use of different strengths of alcoholic menstrua must all be known to him; the extraction of alkaloids and the natural order, habitat, and properties of medicinal plants form a further part of the knowledge he must possess in order to practise his simple duties); syrup of orange, half an ounce (how many different kinds of sugar are there? How are they distinguished and how is the specific gravity of a liquid obtained?); infusion of gentian, to make six ounces (how is an infusion made and how does it differ from a decoction?) This simple process of dispensing also involves other questions, such as standards of weights and measures, the translation of Latin names and directions, incompatibilities, dosage, etc., etc., and when the pharmacist has completed his work, exercised his skill, and supplied the insured person with a bottle of medicine correctly compounded *secundum artem* he receives as a reward, in addition to the cost price of the ingredients he has used, the magnificent sum of twopence. Shade of Galen! It reminds one of the urchin who restored a lost article of considerable value to its owner and received in return a halfpenny, with the injunction, 'For heaven's sake don't go and make a beast of yourself!'"

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HENRY H. RUSBY, M. D.

Dr. Rusby was born in Franklin, N. J., April 26, 1855. His father was a country merchant of that place and in its primary and grammar schools young Rusby began his education.

When he had reached the age of twelve years, his father gave up business and retired to a farm, where the son assisted him in the agricultural work. Having ambition to become educated he exhausted the capacity of his home district for education and then went to Massachusetts where he attended the Westfield Normal School of that state. He then entered the Centenary Collegiate Institute of Hackettstown, N. J. After graduation from this institution he became a teacher at Roseland, N. J.

While occupied in pedagogical work he used his spare time in the study of Botany, and he made an herbarium which contained nearly all the flowering plants and ferns of Essex county. This was exhibited at the Centennial Exhibition of 1876 and gained for its maker a medal and a diploma.

In 1880 he was an agent of the Smithsonian Institution and roamed New Mexico for eighteen months in its service. In 1883 he was engaged by Parke, Davis & Co. to study the medicinal plants of Arizona. In 1884 he was sent by them to South America to study the coca industry, cocaine just then coming to the front as a remedial agent of value. He crossed the continent of South America from the Pacific to the Atlantic, taking eleven months for the trip. It was on this trip that the medicinal value of Cocillana was first brought to light. He brought back from this trip 45,000 specimens, representing some 4,000 species, a fifth of which were previously unknown to botanists. On his return to New York he submitted a plan to the Pan-American Medical Congress for a systematic examination of American Flora, which plan was adopted and Dr. Rusby became the Chairman of the Commission appointed to do that work.

In 1896 he explored Venezuela for botanical specimens and made a large collection of plants. In 1888 Dr. Rusby became Professor of Botany, Physiology and Materia Medica in

the College of Pharmacy of the City of New York, and in 1898 he assumed the Chair of Materia Medica in the Bellevue Medical College.

He has contributed largely to botanical literature and was one of the active promoters of reform in botanical nomenclature, upon which his name is indelibly impressed by the fact of its use as Rusbyii in the formation of many titles of plants. He wrote the monograph on Cinchona for the United States Dispensatory and besides other writings he has published several books, among which is his Manual of Botany. He is also one of the authors of the Standard Dispensatory.

In all of his eminent labors as a botanist and a pharmacologist Dr. Rusby has been handicapped by defective eyesight, a fact which was not recognized until he became a medical student.

In 1906 he became the expert adviser of the Department of Health in New York and in 1907 he was appointed Pharmacognosist at the port of New York. In this work he has encountered much opposition and misrepresentation regarding which Dr. Rusby says:—

"Had we not been interfered with by others, there would at no time have been any occasion for antagonism on the part of any portion of the drug trade, unless there had been some one who was determined to defy or evade the plain intent and provisions of the law. When it became clear to me that a conspiracy existed between certain adulterators and misbranders without and some others within the Department of Agriculture to misrepresent Dr. Wiley and to destroy his reputation, as a necessary preliminary to destroying the efficiency of the law, I communicated the facts in my possession to President Roosevelt, which act ultimately frustrated the projects of the conspirators. This action I took alone, and quite without the knowledge of Dr. Wiley or anyone else in the department. Nevertheless, it was assumed by the enemy that a number of us were associated in the procedure, and each of us was marked for destruction.

"The following incident will serve to illustrate in part the methods employed to accomplish this end: In my letter to the President, I had gone fully into the views of Dr. Kebler and myself as to the proper treatment of importers and dealers. I explained that it was our view that when the purpose of the law and intent of the Department were fully understood, the trade generally would not only meet the requirements but would interest themselves in the work of reform and would coöperate with those conducting it. We therefore held that it would be neither just nor wise to try to see how many offenders could be caught and punished, but that our best efforts should be devoted for some time to instructing dealers as to the requirements and to getting them interested in us. In due course this letter was submitted by the President to a member of the board of food and drug inspection who was bitterly hostile to Dr. Wiley. Some time later this man took occasion to write to Dr. Wiley that I had, in a letter to the President, accused him of entering into an arrangement with importers by which they were to be permitted for a time to violate the law. But for the wisdom and courage of Dr. Kebler in acquainting me with this action, Dr. Wiley might never have been relieved from the impression of this extreme of treachery.

"In spite of all conflicts within and without the Department, I have now no doubt that the drug trade generally has come to understand that drug inspection, at the port of New York, is conducted legally, justly and impartially, and in a sensible and practical manner."

Dr. Rusby joined the A. Ph. A. in 1889 and after serving in many subordinate offices became its president in 1909.

He resides in the Forest Hill section of Newark, N. J., with his charming family of wife and three daughters.

In closing this sketch we cannot forbear quoting the words of an esteemed contemporary:

"His genius for discovering the motives and his courage in attacking the course of those who are guided by policy rather than principle have made him respected by all who know him and feared by those whose armor is sham and whose weapon is deceit. With all his knowledge Dr. Rusby is not pedantic; and with all his devotion to duty he is not austere; on the contrary, he is as simple-mannered, approachable, urbane, frank and friendly a man as one could wish to find for a friend and companion."

Book Reviews

THE EXAMINATION OF WATER, FOR SANITARY AND TECHNIC PURPOSES, by Henry Leffmann, A. M., M. D., Ph. D. Professor of Chemistry in the Women's Medical College of Pennsylvania and in the Wagner Free Institute of Science; President of the Engineers' Club of Philadelphia (1901); Vice-President, Society of British Public Analysts.

Seventh Edition, revised and enlarged with illustrations. P. Blakiston's Son & Co., Philadelphia. Price $1.25.

This book is one most instructive to all interested in water-supplies, particularly to those having connection with the supply of potable water to cities.

It gives a very interesting short account of the water supplies of the ancient cities of Rome, Athens and Jerusalem, in which is corrected the prevalent error that Roman engineers did not possess knowledge of the fact that water rises to its original level.

After classifying the diverse waters which the sanitary chemist is obliged to handle in his investigations, it treats in detail the analytic operations for the determination of their purity and availability for use and also for their purification.

This, the seventh edition has been extensively revised and the procedures brought into general agreement with those rcommended by the American Public Health Association and gives particular attention to processes devised by American Workers in substitution for those of foreign origin.

THE BOOK OF PRESCRIPTIONS, WITH NOTES ON THE PHARMACOLOGY AND THERAPEUTICS OF THE MORE IMPORTANT DRUGS, WITH INDEX OF DISEASES AND REMEDIES, by E. W. Lucas, F. I. C., F. C. S., with an introduction by Arthur Latham, M. A., M. D., F. R. C. P.

Tenth edition. P. Blakiston's Son & Co., Philadelphia, Pa. Price $2.50.

This book aims to supply the defect in present-day medical instruction in its lack of training in prescription-writing and is admirably calculated for its purpose. It informs the medical practitioner of the correct manner of prescribing drugs and gives their proper combinations in order to produce palatable and efficient preparations.

It is a particularly valuable work to be in the hands of every senior student in his work in the hospital, but it is also well devised for the use of every physician who has not received the benefits of a pharmaceutical training and the actual dispensing of drugs.

THE BOOK OF PHARMACOPOEIAS AND UNOFFICIAL FORMULARIES, containing the formulas of the British, United States, French, German, and Italian Pharmacopœias, together with formulas from unofficial sources, as the British Pharmaceutical Codex, the National Formulary of the United States, the Pharmacopœias of the London Hospitals, etc., the whole comprising about five thousand formulas, by E. W. Lucas, F. I. C., F. C. S., Pharmaceutical Chemist and H. B. Stevens, F. I. C., F. C. S., Pharmaceutical Chemist.

P. Blakiston's Son & Co., Philadelphia, Pa. Price, $3.00

In this book an effort has been made to group in a simple comparative form the formulas contained in the authorities mentioned in the title and the work will be found most useful for practical pharmacists desirous of securing such information. In addition to this information there are descriptions of the different processes of the exhaustion of drugs, a Materia Medica table giving the foreign synonyms for drugs; alcohol and thermometric tables and the relations of metric and imperial measures. The book should be a most useful addition to the library of every pharmacist.

THE DETECTION OF POISONS AND POWERFUL DRUGS, by Dr. Wilhelm Autenrieth, Professor of University of Freiburg, i. B., translated from the completely revised fourth German edition by William H. Warren, Ph. D., Professor of Chemistry in Wheaton College. (Illustrated.)

Fourth edition. P. Blakiston's Son & Co., Philadelphia. Price $2.00.

The introduction of new matter and certain re-arrangements of the text make this, the fourth edition of this work quite a different work than previous editions.

The new matter added is of especial value, treating as it does particularly of special methods of analysis. The work divides the toxic and potent substances into three groups:—those which volatilize without decomposition when treated with steam; those which are non-volatile under the same conditions; and all poisonous metals; and the directions given for the treatment of each of these classes is exhaustive.

In addition to this, Chapter IV treats of poisons not in the three groups enumerated; Chapter V treats of Special Qualitative and Quantitative Methods; Chapter VI,—the Quantitative Estimation of Alkaloids and other principles and Chapter VII treating on Carbon Monoxide Blood, Blood Stains and Human Blood.

Students of Pharmacy will find Chapter VI useful in its treatment of drug assaying.

The translation of this German work into English, Spanish and Italian attests its value.

Papers Presented to Local Branches

THE BRITISH PHARMACOPŒIA, 1914.*

M. I. WILBERT, PH. M.

The appearance of a new edition of the British Pharmacopœia immediately before the publication of the revision of our own Pharmacopœia of the United States lends a peculiar degree of interest to the book and would appear to warrant a study of the characteristic features of this new Pharmacopœia. The history and origin of the British and of the United States Pharmacopœias are also interesting largely because of the fact that our own Pharmacopœia is the direct outgrowth of one of the books that were later combined to form the now official standard for the British Empire.

The British Pharmacopœia in the form in which it now appears, is a comparatively recent publication, the compilation being authorized by the Medical Practice Act of 1858 and its publication directed by the Medical Council Act of 1862 to supersede the previously published pharmacopœias of London, Edinburgh and Dublin, only two of which, the pharmacopœias of London and of Edinburgh had an authoritative legal standing.

The earliest of the British Pharmacopœias was that of the College of Physicians of London, the first edition of which was published in 1618; subsequent editions being printed in 1639, 1650, 1677, 1721, 1746, 1788, 1809, 1815, 1824, and 1836.

The first translation of the London Pharmacopœia by Culpeper was published in 1653, and is particularly interesting because of the liberal abuse of the catalogue of remedies.

The first edition of the Edinburgh Pharmacopœia was published in 1699, and this was followed by new editions in 1722, 1736, 1744, 1756, 1774, 1783, 1792, 1803, 1804, 1806, 1813, 1817, 1839, 1841.

An English translation of the Edinburgh Pharmacopœia was published by Lewis in 1748. This book reappeared in several editions and was followed by translations by Webster, Duncan, Duncan, Jr., and finally James. The translations by Duncan and Duncan, Jr., were widely used in this country and subsequently formed the basis of the American Dispensatory by Cox and of the American New Dispensatory by Thatcher. The Edinburgh Pharmacopœia itself was used as the basis for the Pharmacopœia of the Massachusetts Medical Society, published in 1808, and for the first edition of the Pharmacopœia of the United States, pub-

* Presented at the meeting of the City of Washington Branch of the American Pharmaceutical Association, January 27, 1914.

lished in 1820. The reason, no doubt, why the Edinburgh Pharmacopœia rather than the London Pharmacopœia was used in this country, is to be found in the fact that during the Colonial period and for years later many American students were sent to study medicine at the University of Edinburgh, which at that time was considered to be the leading medical school in Great Britain, if not in Europe.

The Dublin Pharmacopœia was published as a specimen Pharmacopœia in 1794, and a second edition of this specimen Pharmacopœia appeared in 1805. The first Dublin Pharmacopœia printed for circulation was published in 1807, succeeding editions being published in 1826 and 1850. The latter or third edition was apparently the first of the several British Pharmacopœias to be published in English.

The first edition of the present British Pharmacopœia was published in 1864. At the request of the Pharmacopœia Committee of the Medical Council the Pharmaceutical Society of Great Britain had delegated Mr. Peter Squire to coöperate in the preparation of the British Pharmacopœia and he served as the pharmaceutical editor of this book. As a direct outcome of his work in this connection we have his still popular "Companion to the British Pharmacopœia" which acquired a very wide circulation not only in England but throughout British possessions, and even in the United States, no less than eighteen editions of the book having appeared to date.

The first edition of the British Pharmacopœia was liberally criticized, and the opinions expressed, particularly in pharmaceutical journals, regarding it were not favorable. While it was admitted to have good qualities, serious defects of omission and commission were pointed out and a new edition of the book, edited by Mr. Robert Warington of Apothecaries' Hall, and Professor Theophilus Redwood, representing the Pharmaceutical Society, was published in 1867. An Addendum to this second edition was circulated in 1874, and the third edition of the Pharmacopœia appeared eleven years later in 1885, a further Addendum being published in 1890. The fourth edition of the Pharmacopœia was issued in 1898, and an Indian and Colonial Addendum in 1900. This Addendum, at the request of the Government of India, was published as a Government of India edition in 1901.

The present issue of 1914 is the fifth British Pharmacopœia and, in general appearance, it has much in common with the volume immediately preceding it. It contains a total of 633 pages, sixty-seven more than are contained in the fourth edition, and officializes a total of 816 drugs and preparations as against 826 described in the body of the fourth edition of the same book. The monographs or descriptions and formulas occupy 462 pages, whereas in the issue of 1898 they required only 389 pages.

The additions in the 1914 Pharmacopœia include forty-three, the deletions 168, as against eighty additions and 189 deletions recorded in the Pharmacopœia published in 1898.

The number, nature and kind of additions and deletions represented by a new edition of a pharmacopœia are usually considered to be an indication of the progress or lack of progress reflected by the book as a whole. From this point of view, the present British Pharmacopœia appears to have been rather liberally criticized, not alone in the Medical and Pharmaceutical Journals of different por-

tions of the British Empire, but also in some of the lay Journals, particularly the daily papers of London and some of the larger cities of England. It would be altogether too ambitious a task to discuss the additions and deletions in detail or to reflect even casually the criticisms that have already appeared. For our purpose it will suffice to point out that by far the greater number of the changes were involved by the inclusion in the body of the book of all but forty-five of the titles formerly in the Indian and Colonial Addendum. This rearrangement of the material also accounts for the fact that despite the very great difference in the number of official additions and deletions the number of monographs in the body of the book is only reduced by ten.

Among the additions not as yet included in our own Pharmacopœia of the United States we find:—Acidum Picricum, Adrenalinum, Barbitonum, Benzaminæ Lactas, Cantharidinum, Diamorphinæ Hydrochloridum, Glucosum, Phenolphthaleinum, Theobrominæ et Sodii Salicylas.

Among the titles not recognized in our own Pharmacopœia we find:—Methylsulphonalum for sulphonethylmethanum, or trional, and Hexamina, a newly-coined title, in place of our own Hexamethylenamine.

Among the deletions we find:—Cambogia, Cantharis, Cerii Oxalas, Cimicifugæ Rhizoma, Cocæ Folia, Crocus, Elaterinum, Ficus, Granati Cortex, Lupulinum, Lupulus, Moschus, Mylabris, Oleum Pimentæ, Piper Nigrum, Prunum, Sarsa Radix, Sassafras Radix, Sinapis, Spiritus Aetheris Compositus, Spiritus Vini Gallici, Veratrina, Zinci Sulphocarbolas.

Among the deleted galenical preparations there are:—Three Decoctions, eight Infusions, seven Plasters, eight Fluidextracts, seven Extracts, sixteen Concentrated Solutions, six Solutions, two Mixtures, three Pills, sixteen Tinctures, and eight Ointments.

Among the innovations included by the additions and deletions we have the substitution of Cantharidin in place of the formerly official Cantharides and Mylabris. This active principle is directed to be used in the making of Plaster of Cantharidin, Tincture of Cantharidin, and Ointment of Cantharidin, in place of the formerly official corresponding preparations of Cantharides.

The deletions noted include Figs, Prunes, and Black Pepper, despite the fact that formulæ for Confection of Senna and for Confection of Pepper are retained. In these formulæ the corresponding substances are directed to be "of commerce," thus recognizing the principle that the nature and character of widely-used articles is sufficiently well regulated by competition not to require further definition or description.

One of the more evident differences between the fifth edition and the one immediately preceding it is the omission of all reference to the Imperial system of weights and measures in the formulas of the Pharmacopœia, quantities being given in the metric system only, with the exception of the doses where, as a transitional provision the Imperial system has been retained. Despite the fact that the editors of the Pharmacopœia announced that the relation between the Imperial and the metric doses of a given preparation is that of approximate equivalents only, the preference in the statement of round numbers appears to have been shown uni-

formly to the Imperial system rather than to the metric system as illustrated by the following examples:—

	Dose	
	Metric	Imperial
Aloin	2 to 12 centigrams	½ to 2 grains
Purified Alum	3 to 6 decigrams	5 to 10 grains
Amyl Nitrite	12 to 30 centimils	2 to 5 minims
Apomorphine Hydrochloride	(By hypodermic injection) 3 to 6 milligrams,	1/20 to 1/10 grain;
	(By mouth) 6 to 16 milligrams	1/10 to 1/4 grain
Atropine	0.3 to 0.6 milligram	1/200 to 1/100 grain
Copaiba	2 to 4 mils	½ to 1 fluid drachm
Cresol	2 to 18 centimils	1 to 3 minims
Prepared Chalk	1 to 4 grammes	15 to 60 grains

In stating doses for liquid preparations the metric quantities are given in mils, a term recognized by the Board of Trade (May, 1908,) as a short official designation for the millilitre. Americans will be interested to learn that this term was originated by the late Professor Oscar Oldberg in his Unofficial Pharmacopœia, published in 1881, and it is a rather handsome compliment to a prominent American pharmacist to have the renewed suggestion to use the word mil in place of the very cumbersome "cc." or cubic centimetre, reintroduced into this country from abroad.

In connection with the doses, the editors of the British Pharmacopœia explain that while the doses given in the Pharmacopœia are not authoritatively enjoined upon prescribers, it is the duty of the pharmacist or dispenser whenever an unusually large dose is prescribed to satisfy himself that the prescriber's intention has been correctly interpreted. This paragraph would appear to put the onus of dosage on the dispenser and differs from the usage evidenced by continental pharmacopœias which include maximum doses of potent medicines: quantities to which the prescriber is specifically limited and required to note any excess so as to indicate that it is done with full knowledge of facts and not through inadvertence.

The list of articles and preparations the composition of which has been altered, includes fifty-one titles, of which seven preparations were changed to correspond approximately to those recommended in the International Agreement of September, 1906. The strength of forty-one articles and preparations has been altered materially, and of these ten were changed to correspond approximately with the requirements recommended in the International Agreement referred to above. A table is also appended recording the deviations from the recommendations of the International Agreement, the nature of the recommendations and the reason for the deviation.

The list of articles and preparations the names of which have been altered, include a total of thirty-five titles largely of botanical drugs and preparations. No material change has been made in chemical nomenclature and the familiar Latin titles have generally been retained unaltered. The preface also calls attention to

the fact that the English titles are not as a rule literal translations of the Latin titles and that only the more important synonyms have been inserted.

A table of abbreviated Latin names of official drugs and preparations of the British Pharmacopœia is included in an Appendix and has elicited considerable comment, one reviewer expressing the hope that the abbreviations included "will never be put forward as legally binding. They do not appear to be so at present, but the list should not be unnoticed; many of the abbreviations are horrible."

From the preface to the Pharmacopœia it would appear that the same or similar abbreviations are to be included in the Pharmacopœia of the United States, and that the list was included in the British Pharmacopœia in the interest of international uniformity, with the suggestion that they "will probably be found useful to dispensers and others, especially those in foreign countries who have to interpret the abbreviations according to the prescriptions of British practitioners."

The monographs and descriptions of chemical substances are interesting because of the frequent occurrence of a purity rubric and of a modification of that portion of the paragraphs in former issues which purported to be descriptive of the sources or modes of manufacture of official chemical substances. These descriptions have been made more concise, but the physical and chemical characteristics and tests by means of which the substances may be identified and their freedom from impurities determined have been amplified and increased in number.

The quantitative tests for the basic and chemical radicles of ordinary salts instead of being repeated in the text as in the previous edition, or in our own Pharmacopœia of the United States, have been brought together connectedly in an Appendix, the text simply stating the names of the radicles or other combinations which should be present or absent. Infrequently applied tests are as heretofore included in the monographs themselves.

A quantitative limit test for arsenic and a table showing the limits of arsenic in parts per million, also a quantitative limit test for lead with a corresponding table showing the limit of lead in parts per million are given in the Appendices which also include methods for the general determination of acid value, saponification value and iodine value of fixed oils, fats and other products, the determination of esters and of alcohols in volatile oils, the determination of boiling points, melting points, refractive index, optical rotation and specific gravity of official substances, also methods for making extractive preparations, dyes, lozenges, alternative preparations sanctioned for use in tropical countries and a definition of the permissible limit of error in alkaloidal assays.

In connection with the descriptions of botanical drugs the histological characteristics of parts of plants officially recognized are fully described, and in many instances the histological characteristics of the powder are given, particularly when by chemical testing alone the identity or the purity of the article could not be certainly determined.

The number of assay processes for botanical drugs and for galenical preparations and volatile oils has been increased considerably, the present edition requiring the assay of thirteen crude drugs, seven of which are for alkaloids, the assay of twenty-five galenicals and of eleven volatile oils. In many instances the official processes for the assay of drugs and preparations have been revised in accord with

the recommendations of the Reference Committee on Pharmacy of the Pharmaceutical Society.

In connection with the volatile oils and fixed oils, additional tests for identity and purity have been introduced, the characters and tests ordinarily including in addition to requirements for color, odor, and specific gravity, also optical rotation, and, as noted above in many instances, an assay method for the determination of the more important constituents.

Unusual methods of administration have not been specifically recognized and apart from a note by the editors in the preface to the Pharmacopœia that "when official drugs are so directed by the prescriber, the drugs of the Pharmacopœia may be dispensed in non-official forms such as capsules, cachets, granules, compressed discs or tablets, and the like; but the drugs themselves, in all such cases must respond to the official characters and tests."

An index of forty-seven pages makes the book and its contents readily available for reference purposes, and altogether the opinion expressed by the editors of the Pharmacopœia that the Pharmacopœia Committee of the Medical Council, "has now been able to produce a British Pharmacopœia suitable for the whole Empire," appears to be reasonably justified.

MODERN DRUG STORE MERCHANDIZING.

E. FULLERTON COOK, P. D.

At the January meeting of the Philadelphia Branch of the A. Ph. A., Mr. Louis K. Liggett of Boston, presented an interesting and illuminating analysis of the business side of certain types of modern drug stores.

The following outline briefly reviews his treatment of the subject:

That the proper grasp of the details of business may be insured, it should be divided into departments, each being separately studied and managed and each having separate financial records. Soda water, cigars, candies, prescriptions and general merchandise are classifications which suggest themselves.

The Soda Fountain properly conducted and with careful management should and can be made to yield 50 *per cent.* gross profits. In figuring the costs do not fail to include every expense including breakage, icing, napkins, glasses, etc., etc. Here the quality of the service is of the utmost importance. Selling price is not the main consideration. People are willing to pay more for quality and right treatment.

The basis of a successful soda business is, first, ice-cream which is just right; secondly, cold liquids—10 to 15 degrees above freezing always; with these assured you have the beginning of a good business.

Cigars:—The best grade of cigars may be ruined by lack of proper care. An open door to the cigar case and a radiator behind will make "English Cigars" of the finest kind in one week, "water-logged, seasick and dried out." The cigar case should be carefully watched and be gone over at least once every day, to see

that well-filled boxes are always in sight and the proper degree of moisture is maintained.

Buy with much wisdom. Don't load up with dead brands. Here again service counts. One store in Boston, with only a nine-foot case, does over $100,000 worth of cigar business a year, against keen competition. This is only because they give unusual service. The salesmen in this store know their customers' preferences and serve them with politeness and dispatch. A good cigar business is valuable to a drug store because it brings the men's trade. Give the customer what he wants and give it quickly. Cigar sales should yield, at least, 26 *per cent.* gross profit.

Candy:—This is a rapidly growing department in many stores. There are two kinds of candy selling—in packages and in bulk. The first can be bought to yield an assured 32 *per cent.* gross profit. Bulk goods can be bought to yield, theoretically, as much as 40 *per cent.* gross profit, but in practice this always shrinks to 28 or 30 *per cent.* Why? "Because she always gives over-weight (18 ounces to the pound) and each time eats two more."

Don't sell a 60 cent candy for 80 cents. You may sell the first pound but the customer does not return. *Give full value.* Buy to make from 32 to 36 *per cent.* gross profit from candy sales.

General Merchandise:—The great problem of every business is to make the store yield a net profit. The proprietary medicine business shows a fluctuating gross profit. Where 92 to 95 cents is obtained for $1.00 goods it is possible to make from 32 to 33 *per cent.* gross profit. When cut rates prevail the gross profit may be cut to from 12 to 15 *per cent.* or even less with an actual loss on every sale.

The expenses of the retail business in all lines has just doubled in the past twenty years. This is due to the establishment of delivery service, higher-priced clerks, increased lighting requirements, laws cutting hours for labor, etc.

It becomes necessary, therefore, to watch every detail of the business if it is to be made to yield a net profit, and if you cannot do this, get rid of it as soon as possible.

Take at least one accurate inventory. Write up each section on cards or inventory sheets, and then some night call in your friends and call it all off even if it takes all night. Then having figured what your actual gross profits have been, budget each department. For instance, if you do $100.00 of cigar business a month and you find through careful records and your inventory that you have been making 20 *per cent.* gross profit, limit your purchase to exactly $80.00. If you can do the same business ($100.00 worth) that month, you can be sure of the 20 *per cent.* gross profit. On the other hand, if stock becomes short you will know that something is wrong and will be interested enough to investigate.

Start with one department, study it in this way and budget it, as suggested, and you will soon be so interested and so greatly benefited, that you will find it possible to treat all departments in the same way.

Every business should be analyzed and studied, and made to conform as nearly as possible to carefully outlined plans, which insure a profit. The following illustration serves as a model, and although subject to slight variations, depending

upon the nature of the business, it yet affords a basis for comparison which should be helpful to every man engaged in the drug business:

Assuming that the sales are $3000.00 a month, and stating all *per cents* as *per cent.* of the total sales, then:

Total sales	$3000.00	100 per cent.
First cost of goods	2000.00	66⅔ per cent.
Gross profit	$1000.00	33⅓ per cent.

From this $1000.00 must now be paid all expenses, and from it must also come the net profit, if any is to be made. It should be divided about as follows:

Rent, heat and light (the only fixed charges)	$ 210.00	7 per cent.
*Clerk hire	360.00	12 per cent.
Advertising	60.00	2 per cent.
All other expenses	120.00	4 per cent.
Net profit	250.00	8⅓ per cent.
	$1000.00	33⅓ per cent.

For a business of this size, budget yourself to buy only $2000.00 of goods a month and you will have $1000.00 in bank for expenses and profit. You should spend 2 *per cent.* of your sales for advertising if you would retain your business and slightly increase it, but be sure the advertising is judiciously done and in such a way that it pays.

Always put your detailed expenses down in black and white and study it. Freight on goods should go to expense and should not be added to cost of goods. You will then soon eliminate it by buying the same goods in some other way without freight cost, or else make the other fellow pay the freight. If your electric light exceeds your limit set for that expense, you will immediately want to know the reason why, and so each expense item will come up for study and analysis. Remember your net profit depends upon keeping expenses down.

To conduct a business of this amount how much capital is necessary? The location makes a great difference, and the kind of goods sold is also an influence. You should aim to make at least four turn-overs of stock every year. Don't allow general merchandise to remain on the shelf; if anything, not a staple, proves to be a slow seller, get rid of it through a special sale. By turning stock at least four times on the average each year, a $3000.00 a month business would require a capital of about $6000.00 for fixtures and $8000.00 for stock; a total of $14,000.00. If the turn-overs can be made more frequently less capital is necessary; if less frequently, a larger capital will be required.

*If a large part of the business is in the prescription department, the per cent. of expense for clerk hire will increase, but the first cost of goods will proportionally decrease.

THE SALE OF POISONS.*

WM. MITTELBACH, PH. G.

The sale of any poisonous substance is always connected with more or less responsibility by those engaged in its distribution; and the legal restrictions placed about such sales are fairly well designated in our state law. Our law in this state (Missouri) is about as clear and complete as in most other states; and the list of poisons recognized under schedules A. and B. as extensive as in other states. Massachusetts' law sets out the most complete and extensive list and is a drift in the right direction. This, in my opinion, is a better law, and throws more safeguards about the sale of poisons. I hold that all substances that are of a dangerous or poisonous nature should be registered—their distribution or sale, I mean. As the Missouri law now stands, only a few of the most potent or powerful drugs or chemicals must be registered; while a long list of less potent, yet of dangerous character, can be distributed or sold almost *ad libitum*—the only requirement being that the purchaser be informed of their dangerous or poisonous character.

We all recognize that all drugs are more or less potent—otherwise they would have but little therapeutical value. Then why draw a line anywhere in controlling their sale to the laity? I, therefore, hold that no distinction should be made in listing substances sold by the pharmacist as "poisons" or "poisonous substances"; but that the sale of all should be placed upon the poison register. The argument that poisons should only be distributed through the physicians, and upon their written order, is rather weak and impracticable. The licensed pharmacist is better qualified to guard the sale of poisons than is the average physician. He, being directly responsible for the distribution of poisons, will naturally watch more carefully their sale.

The registration of all poisonous substances involves very little additional trouble and will simplify the whole matter. As new drugs, chemicals or substances are brought into use, they, if of a dangerous or poisonous character, can be added to the list. Such a change in our law will be beneficial, and simplify the sale of poisons while it will add to the pharmacist's protection.

COMMERCIAL PHARMACY—A TIMELY TOPIC.*

ALFRED W. PAULEY.

We are living in a day and age when we are obliged to recognize commercial pharmacy as a very important factor. First of all, let us consider the definition of commercial pharmacy. One of the best definitions that I can mention is this:—Commercial Pharmacy is a science that treats of mercantile transactions pertaining to pharmacy, or it may be defined as the business-end of pharmacy.

If it is true that commercial pharmacy represents the business-end of pharmacy,

* Read before St. Louis Branch, January, 1915.

then we must recognize it and admit it into our professional ranks, in the colleges as well as the drug stores. It was my pleasure, not so very long ago, to listen to several very prominent addresses made before a body of men and women who were gathered in St. Louis for the purpose of promoting social, professional, educational and business interests. These men represented many states of our great country, and are noted the world over for their professional, chemical and pharmaceutical knowledge. One of the speakers in his address made a comparison of pharmaceutical classifications, which was divided into two classes; one whom he said studied pharmacy with a view of making it a profession, while others studied with a view of making it a vocation. He seemed to lay special stress on the professional student overlooking the importance of commercialism, which to my mind is absolutely essential in pharmacy to-day. In order to make a pharmacy successful professionally, we must use commercial methods. Now let us consider one of the causes for adopting commercial pharmacy. Can any one of us run a drug-store to-day as our forefathers did? We may but look back, to the days in which the professional pharmacists ruled and governed pharmacy, and before the time of the existence of the department-stores and commercial drug-stores; and we must give those men credit for running apothecary shops in an ideal manner; but isn't it likewise true that all progressive professional and commercial enterprises have applied themselves to the modern-day methods due to the vast changes that were forced upon them? Let us consider some of the reasons that caused us to take up the commercial end of pharmacy. We may, individually, remember that a diphtheria case in the neighborhood of our drug-store would result in considerable prescription work for the patient, and, usually, the patient required medicine daily for two, three or possibly four weeks. To-day one injection of diphtheria anti-toxin is sufficient in most cases. Thus the prescription trade is not obtained. Besides this, we have a number of other diseases which now are treated by the use of Vaccines, Bacterines, Phylacogens, Salvarsan and the like. Furthermore, we, to-day, have Christian Science, faith healing, the Fletcher System, Physical Culture, Psychology and many other things of similar nature that deprive the pharmacists of the prescription business that he formerly enjoyed. With this condition apparent, isn't it true that the commercial departments in the drug-store of to-day help reduce the prices that we would be obliged to charge for prescriptions had these commercial departments not been established, or in other words, the commercial departments have a tendency to cut down your overhead expense. Furthermore, let us consider with all due reverence to the professional man of former days, and ask this question:—Has he achieved success financially?—Has he reached his ideals? If he has professionally we must honor him. We, however, must have more than this professional ideal in mind, especially if we have families to support, or other obligations to meet, and therefore in order to make a financial success "which in my mind is absolutely essential," we must combine commercial pharmacy with professional pharmacy and get the professional educators willing to coöperate with us. Then combine their ideals and we will have commercial professionalism or professional commercialism as the one ideal for which to strive. There is a difference between commercial pharmacy and commercialized pharmacy. Commercial pharmacy, as its name implies, is the trading of commercial products for the benefit of the public

as well as for profit; while commercialized pharmacy, in my mind, would represent trading for the profit and disregarding the public. Commercial pharmacy has been scorned by a great many professional pharmacists, but I want to tell you that the commercial pharmacist is just as honorable and upright in his dealings as the professional pharmacist, and if this is true, then let us get together and make commercial pharmacy one of the important factors of the twentieth century, or sooner or later, we will have the universities encroaching upon the rights of the regularly instituted colleges of pharmacy and take from them that which they have worked so hard to build up.

Let us consider the words of Cicero, who so wisely said:—"It is not the place that maketh the person, but it is the person that maketh the place honorable." Therefore, let us follow the footsteps of Atkinson who directs us as follows:—"Put in your own mind the existing condition which you wish to become real; then see the thing as you wish it to be"; and as Alex. Bell likewise gives us this valued advice in saying "Concentrate all your thoughts on the work in hand. The sun's rays do not burn until brought to a focus." Just so, the sun's rays of commercial pharmacy will likewise not burn until brought to a focus. Feeling satisfied that most of us are in accord with these commercial pharmacy ideas, let us proceed to take up the most important steps that are necessary in making commercial pharmacy a success. Most essential is that of salesmanship. Salesmanship is the scientific cultivation of good will. Another definition is that salesmanship is honesty, courtesy, tact bound up with an interest in, and a thorough knowledge of your stock, all resolving into the art of converting a transient patron into a steady customer. All of us, possibly, have seen the illustration of salesmanship conveyed by a prosperous business man to his son as he started out in life, which bears this inscription:—"Remember, Jakey, when you sell a customer what he wants, that is nothing; but when you sell him what he don't want, that's business." Some of the most essential factors in salesmanship are first:—A salesman must have a thorough knowledge of his merchandise and not attempt to sell winter merchandise in the summer, or attempt to sell ice skates for sake of example, in the Fiji Islands.

So that the most important thing is a thorough knowledge of the goods you have for sale. He should know of what it is made, how it is made, what it is for and all that. It will go to show the customer that you are perfectly familiar with the merchandise you have to sell. A good salesman must possess, besides this knowledge of his merchandise, all the attributes of a salesman. These three particular factors are essential:—

PUSH, POWER AND PERSONALITY.

Under the head of Push comes initiative, ambition, enthusiasm and tact. He must have power to convince. The fact is, that a salesman must possess the power to make a customer feel as he does about the product he has to sell, and *this is one-half* of the battle. His personality goes a long way in making the people feel they are welcome in his store. As I once heard a customer say, "I like to go into a warm store; not a steam-heated store, particularly, but a heart-heated store. The store where the clerks act as though they were glad to see you. I like to go into a store where I feel welcome. I like to go into a store where there is no unnecessary delay when I ask for an article. I like to go into a store that is cleanly,

and these points show personality." Then he must be optimistic. The next essential that I would consider would be that of:—

HEALTH, HAPPINESS AND HARMONY.

Health, as you know, is the greatest factor in keeping business going right. Happiness is a factor that keeps your organization in good running order like good oil used on machinery will keep it running right. The employee with a grouch can spread more dissatisfaction than the boy with the measles can spread the infection in a crowded room. Harmony is absolutely essential because no store, no home or factory can really prosper unless the employees work in harmony, and the proprietor should likewise work in harmony with the help. Who should the salesman work for, and who is the boss of the store? It is the customer that you and I are working for. It is the customer that you and I are here to please. It is the customer who pays your wages and mine. If it were not for the customer, you and I would be looking for a job and we might not get one as good as the one we have. Now, if you are sitting behind your counter doing nothing, and you see a customer (the boss) coming,—Jump.

The commercial pharmacist in his commercial field has a decided advantage. A well-known physician once expressed himself thus:—"A physician renders his service to the sick, the poor and the ignorant, while the pharmacist renders his service to the well, the wealthy and the wise." He infers that we are better off and can keep in better spirits when trading with that class of people. While I am not in accord with all his statement, yet I feel, to a degree, that pharmacy has its advantages. This being the case, let us be optimistic. Let us put on the smile of the optimist and discard the smile of the pessimist. Go forward to make every day count and if possible make some of them count for two, and let us not put anything in the way of the advancement of commercial pharmacy as we do not know how far-reaching it may be. Be kind to your fellow neighbor; do good whenever you can.

Remember the words of A. B. Hagemann which reads as follows:—"I shall pass through this world but once. Any good, therefore, that I can do or any kindness that I can show any human being, let me do it now. Let me not defer or neglect it, for I shall not pass this way again."

THE CULTIVATION OF MEDICINAL PLANTS IN THE UNITED STATES.*

F. A. MILLER.

The cultivation of medicinal plants in the United States is only in the very earliest experimental stage. Whatever may have been done toward investigating the peculiarities of growth of this class of plants, has so far had little influence upon their commercial production. With the beginning of the work of the United States Department of Agriculture on the cultivation of these plants and the interest shown by colleges, scientific societies and commercial institutions,

* Abstract of an illustrated lecture delivered before the Chicago Branch, November 17, 1914.

our knowledge of the behavior of a number of the more important ones has gradually increased until we feel more confident of success. To the many inquiries upon the possibilities of success, however, we must still reply in a cautious and conservative manner. This attitude is advisable and indeed necessary for several reasons. To enumerate, a druggist, doctor, farmer or other individual wishes to engage in the commercial cultivation of medicinal plants. Their questions usually come in the following order:—what to grow, what species used, where to obtain authentic, viable seeds, how and when to plant, on what type of soil, when and how to harvest, what part or parts of plant used, how cured and packed, principal markets, prices paid, and annual consumption? Apply this series of questions to any one of the more valuable drug plants such as digitalis, belladonna, henbane or cannabis, and who among us cares to undertake the task of answering them? It is true that these are the very questions that are under investigation, but as yet only a beginning has been made toward their solution. Taking up these problems in their logical order, we find that they fall into certain classes.

The first of these classes includes all the problems of propagation. This involves the sources of seed and plant supplies and the accuracy of names, methods of seeding, as to whether or not open-field sowing can be practiced or the necessity of greenhouse accommodations in carrying the plants through the earlier stages of development. Vegetative methods so commonly employed by gardeners and florists are little used with medicinal plants. It is one form of this method that has proven so successful in the propagation and re-setting of peppermint and spearmint. The second class of problems to be solved is that pertaining to the manner of cultivation. This includes duration of growth requisite for a harvest, whether annual, biennial or perennial; nature of tillage, as to the use of hand or power labor; types of soils and fertilizers and their influence, both upon the production of crude material and the relative percentage of active principle. Following the natural order of procedure, class three covers the operations of harvesting. The nature of these operations varies widely according to the character of the part of the plant used. Roots, seeds, leaves and flowers involve as many operations and, what is of considerable importance, usually require special types of machinery or much expensive hand labor not common in regular agricultural practice. Concerning the time of harvesting these various parts, little is known of the seasonal variations of the active principles. The process of curing represents the fourth class of operations to be considered. It is self-evident that medicinal plant products cannot be cured in the same manner or by the same methods as agricultural crops. A crop of digitalis, or stramonium, cannot be harvested and cured with the same ease and rapidity as a crop of corn, oats or wheat. Handled in large quantities, these drug crops would all require a special equipment in the form of drying sheds, cutting machines, etc. At this point the time of harvesting is in question. When should the various classes of drugs be gathered in order to show the greatest medicinal value? We are all familiar with the wide variations exhibited by plant products as the plant progresses from the earliest stages of growth to maturity, and whether it is an alkaloid, a glucoside, a resin or what not, there is some stage in the life history of the plant when these products are present in greatest quantity. While this

has been determined to some extent for a few forms such as belladonna, stramonium and bloodroot, there is still much to be done before we can say just when a plant or plant part should be collected, in order to give the best product in proportion to the highest yield of crude material.

Thus it is evident that the whole problem of drug cultivation is still one of experimentation. That it will pass this stage successfully, especially with reference to the most essential vegetable drugs, we have little doubt. This success, however, will probably not fall to the lot of the farmer or layman. Little assistance can be expected from those people in solving the many-unsettled problems. As with the average drug collector, they see little necessity in the careful preparation of materials going to make up pharmaceutical preparations. On the other hand, it is their opinion, as well as that of many others, that medicinal plants will grow and thrive without any care or attention. In this respect, I know of nothing better to say to the beginner in drug-growing, than that medicinal plants do not grow and flourish, out of an impossibility to do otherwise, but that they have an excuse for living and growing, in that they respond to the same selective agencies as other economic forms and exhibit during their life history, a delicacy of balance, with reference to their active constituents, so essential that an error of a few days in harvesting and curing may turn success into failure. The mere fact that a form grows commonly about the fields, or appears as a troublesome weed in and about farm lots, or may be grown with comparative ease as a decorative or garden form, does not necessarily indicate that it will behave in a similar manner under field conditions. Indeed, this is rarely the case, and close observations will reveal the fact that most of our native wild forms are growing under an environment not at all comparable to field conditions as interpreted in terms of agricultural science. Too many recommendations based solely upon back-yard observations, have already been made for growing certain medicinal plants. Also, a too liberal spirit has been shown by some in the selection of forms best adapted for cultivation in this country. In my mind this number should be comparatively small and, even under the present market conditions, should not include more than twenty-five drugs, some of which are, aconite, belladonna, burdock, calendula, chamomile (German and Roman), cannabis, colchicum, conium, convallaria, digitalis, goat's-rue, hydrastis, henbane, larkspur, marshmallow, pulsatilla, rue, savin, stavesacre, stramonium, and wormwood. A clear understanding of these forms as to species used, methods of propagation, systems of seeding, cultivating, harvesting, curing and packing, should be had before attempting to make recommendations for their commercial production.

Taking up the question of drug-growing from another viewpoint, let us consider the possibilities of improvement from the stand-point of plant-breeding. We should not be satisfied with merely growing and domesticating these wild medicinal plants, but should so improve them through selection, hybridization and the testing of different species, varieties and strains, that better and more uniform crude products can be obtained. In attempting to thus improve medicinal plants, we are not attempting a new problem. We are only applying old and well-tried principles to new forms. Who of you, would at this day and age, turn to the woods and fields for plants of the strawberry, raspberry, blackberry, plum or a host of others, with which to re-stock your gardens and orchards? The idea of

wild, native ancestors for all economic plants in existence, rarely occurs to the layman and if so, it is quickly dispelled by the ever-ready nurseryman to supply him with new and improved varieties especially adapted to certain soil and climatic conditions. These varied forms have added much to our daily health and pleasure. Our eyes are delighted with the beauty of form and color of some favorite fruit, and our appetite appeased by a flavor so fitting to our individual tastes as not to be possessed by any other variety in existence. And so, in health, we enjoy the products of the plant-breeder, while, in sickness, we are subject to all the variations and imperfections of nature, in the use of products obtained from plants of unknown parentage and growing under conditions so adverse that their life history is one continued struggle for existence. Why not treat disease, in so far as botanical drugs are involved, with preparations derived from carefully selected, and improved strains, grown under controlled conditions and in such a manner that greater uniformity and high quality would be insured? We should have a strain of belladonna testing six- or seven-tenths of one *per cent.* of alkaloids instead of three-tenths, a strain of henbane which could be collected and cured in such a manner that barn-yard refuse could be eliminated, and assaying one-tenth of one *per cent.* instead of the now almost impossible seventy-five thousandths of one *per cent.* With stramonium a strain has been developed, which last year tested seventy-four hundredths, as compared with wild plants of the same locality which tested thirty-four hundredths. *Digitalis lanata* has shown in preliminary tests, an activity much greater than the official species. True, this activity may not be due to the same active constituent, or combination of constituents, as that of the species *purpurea,* but the fact that there does exist a more toxic species than the one in common use, indicates the necessity for investigation and the possibility for the plant-breeder to develop an improved strain. And so we might continue to take up the various phases of the problem, as to the possibilities of developing annual strains of such forms of biennials as digitalis, henbane, conium, etc., and the influence this would have upon the success of commercial production. In this respect the standards of the pharmacopœia must be reckoned with. These standards must be the guide of the prospective drug-grower, for, in many instances, they, in themselves, point out the many difficulties to be overcome if the proposition is to be a profitable one. For instance, the present pharmacopœial requirement for digitalis, includes only the leaves from flowering plants. This plant is almost strictly a biennial, meaning that land must be occupied two successive years by the plant before a harvest is realized. It is also a plant that cannot be seeded by open-field methods, but must be started in the green-house and transplanted. The question immediately arises as to the advisability of recommending this plant for cultivation. With belladonna and stramonium, only leaves are official, while it has been found that the stems of both of these plants contain at certain stages appreciable quantities of alkaloids. If the whole above-ground portion of these plants could be used, it would greatly facilitate the operations of harvesting and curing and at the same time materially increase the yield of crude material. Also, only the species *Datura stramonium* is now official, while it is known that the species *Datura tatula,* which is more common in this locality, contains as much and in some instances even more alkaloids. While some may claim that the alkaloids of these two plants are not identical, still

their close botanical relationship and the fact that we have evidence that European stramonium leaves are many times probably a mixture of these two forms, strengthens the assertion that there is little difference in their therapeutic value.

And so we might continue to take up the various problems of drug cultivation, together with their probable solutions, but space will not permit. In conclusion, therefore, it should be clearly understood that these problems are not simple ones and those undertaking their solution should bear in mind that the cultivation of medicinal plants involves more than merely allowing crops of weeds to grow in spite of themselves, in cutting them down when most convenient, pulling them out by the roots or otherwise, and quickly transferring them to the manufacturer who will be waiting with open hands to receive them at fancy prices. It has seemed advisable, therefore, to recommend to those interested in drug-growing, that they begin on a small scale with a few of the most promising forms, and that they be so situated and equipped that they can carry these through an experimental stage, developing their method of propagation, seeding, harvesting, curing, etc., before attempting any operations upon a commercial scale.

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CAN THE PHARMACOPŒIA AND THE NATIONAL FORMULARY BE MADE POPULAR WITH PHYSICIANS?

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Time and again has the idea been expressed that physicians as a class do not take enough interest in the Pharmacopœia and the National Formulary. As the truth of this proposition is quite generally admitted, it is probably unnecessary to adduce proofs in support of the assertion. All will agree that it is desirable to make these formularies popular with physicans. The question is: Can it be done?

In an article entitled: "Why physicians do not read the Pharmacopœia," Dr. Chambers (1) summarizes the reasons as follows: First, the physician fully trusts the application of its information to the pharmacist without question; and, secondly, the information the physician seeks for practical application by himself is not contained in the book. So little, indeed, of practical value to the physician is to be found in the book, that we might fairly raise the question: Why *should* physicians read the Pharmacopœia? An additional reason for the indifference of the physician toward the Pharmacopœia is the impression forced upon him that the Pharmacopœia is non-progressive; for nearly every mail brings to the doctor cleverly worded advertisements for proprietary medicines, all of which, no matter how varied their nature, agree in one respect, namely in claiming directly or indirectly, that they represent a decided advance or innovation in respect to the Pharmacopœia.

Now what can be done to make the Pharmacopœia more popular with those for whose guidance chiefly the work is published? Should we attempt this by intro-

ducing information on pharmacodynamics and on therapeutics? Assuredly not, for the Pharmacopœia is a book of standards. Or should we introduce into it the latest and the untried; sacrificing its dignified conservatism? Of course not. Though it is a fact that the Pharmacopœia contains only well established and much used drugs and preparations, it is unfortunately also true that doctors do not look upon this book as a guide for the determination of the value of medicaments. It is well known that the Pharmacopœia contains articles of admittedly doubtful utility; and also that, for various reasons, it cannot contain all the medicaments of value. To limit the Pharmacopœia to drugs of undoubted therapeutic value, has been strenuously advocated of late; and, as a principle, the idea appears perfectly sound. Its application would, however, eliminate from the book many drugs that are much used, thereby lessening the value of the Pharmacopœia to the pharmacist; it would offend many of the rank and file of the medical profession, wedded as some of them are to the use of some of these drugs of doubted activity; it would probably not enhance the popularity of the Pharmacopœia, at least not for quite a time to come.

Hence it may seem an almost hopeless task to make the Pharmacopœia popular with physicians. This statement is made without questioning, in the least, the utility, aye the necessity of the Pharmacopœia; that is admitted by all physicians. The Pharmacopœia is as necessary as is our code of laws. Yet our legal statutes do not constitute popular reading, even though they are made for the people.

Nevertheless, it seems, that everything possible ought to be done to acquaint physicians with the forthcoming revision of our formularies. Perhaps one way in which this society might be of help in this direction would be by the publication of a "Commentary upon the U. S. P. and N. F. for Physicians," a booklet that would briefly set forth the facts connected with the new formularies that are of interest and importance to physicians. Of course, nearly all medical publications will give lists of the changes, the additions and the deletions that have occurred; so that a mere dry statement of the facts would not be called for. The book issued by this society might go further. It might state the reasons for the changes, so that physicians might understand why they are asked to inconvenience themselves by departing from accustomed ways of prescribing. Such commentary might perhaps also give brief historical notes in connection with important drugs and preparations; for historical knowledge is eminently calculated to inspire respect or at least an understanding for things as they exist at present. Posology, the study of doses, is a very vital matter for medical men; and the maximum doses of various pharmacopœias, minimum fatal doses wherever available, and possibly children's dosage as given by various authorities might profitably be included in such a book. A brief statement of legal enactments in connection with drugs might also be of interest. There are, no doubt, many other items of information, as, e. g., the form in which various medicaments are best and most commonly prescribed, that might be included, so as to make the book truly worth while for the physician. On the other hand, pharmacists should not presume to offer to the physician information on pharmacodynamics or on therapeutics, as these subjects are decidedly out of the sphere of the pharmacist's study.

That something can be done to popularize the preparations of the U. S. P. and N. F. has been shown by a statistical investigation carried on by the author sev-

eral months ago, by means of a *questionnaire* sent to some of the leading pharmacists of this country. An analysis of 10,000 prescriptions (2) showed that 24% of them contained proprietary medicines, which, though still too high a figure, shows a decided improvement over the figure obtained by Motter (3) in 1906, who as the result of an examination of 5000 prescriptions found 47% calling for proprietaries. This reduction in the use of proprietary medicines by about one-half may, it seems, be justly ascribed to the propaganda in this behalf carried on by the American Medical Association, through its Council on Pharmacy and Chemistry, and by the National Association of Retail Druggists. These figures mean that the preparations of the Pharmacopœia can be made more popular by propaganda. The forthcoming revision of the Pharmacopœia and the National Formulary offers an excellent opportunity for renewing them. Might not this society do its share in advancing the good cause?

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ESTIMATION OF CINEOL IN OIL OF EUCALYPTUS.*

JOSEPH L. TURNER AND RALPH C. HOLMES.

The question of an accurate determination of the quantity of Cineol in Oil of Eucalyptus is still unsettled, notwithstanding the quite considerable amount of research which has been devoted to it, and, judging from its present status, it will not be settled for some time to come. This is to be regretted the more, since it is now established beyond dispute that the value and therapeutic action of eucalyptus oils depend exclusively upon their content of cineol (eucalyptol). Various methods proposed heretofore, without exception, suffer from one shortcoming—gross inaccuracy; either due to the wrong basis of method, or to the instability of those compounds which have been suggested as serviceable for the separation of Cineol.

To the class of methods based on wrong premises belong the "Permanganate Method" proposed by Francis D. Dodge (Journal Industrial and Engineering Chemistry, Vol. IV, August, 1912, p. 529), and the "Resorcinol Method" proposed by Schimmel & Co., (Semi-Annual Report of Schimmel & Co., October, 1907); the latter method is now slated for inclusion in the Ninth Revision of the United States Pharmacopœia, and it will thus become responsible for the admission into the pharmaceutical practice of inferior eucalyptus oils, as we propose to show further below.

The methods based on the separation of unstable addition products of cineol, are:—the Phosphoric Acid method and the Hydrobromic Acid method.

The various methods mentioned will be outlined briefly, as it is not our purpose here to enter into a thorough discussion of these. Exhaustive information, both

* Presented at the November meeting of the New York Branch of the American Pharmaceutical Association, November 9, 1914.

pro and *con,* may be obtained from the literature on the subject, and especially by perusing the Semi-Annual Reports of Schimmel & Co.

1. *Phosphoric Acid Method*:—"Introduce into a beaker a solution prepared by dissolving 10 cc. of Oil of Eucalyptus in 50 cc. of purified petroleum benzin; immerse the beaker in a freezing mixture and add phosphoric acid, drop by drop, with constant stirring, until the white magma of cineol phosphate formed, begins to assume a yellowish or pinkish tint; then transfer the magma to a force filter, wash it with cold purified petroleum benzin, and then dry it by pressure between two porous plates. Transfer the precipitate (cineol phosphate) to a narrow graduated cylinder, and add warm water, which will cause separation of the cineol. The volume, in cubic centimeters, of the separated oil, multiplied by 10, represents the volume *per cent.* of cineol (eucalyptol)."

The addition product of eucalyptol with phosphoric acid, as obtained by this method, is a semi-solid sticky substance which decomposes very readily and renders a quantitative separation very difficult, if not altogether impossible. In consequence of this, the results obtained by this method are invariably too low.

2. *The Hydrobromic Acid Method* is carried out as follows:—"In a highly cooled solution (freezing mixture) of 10 cc. eucalyptus oil in 40 cc. low-boiling petroleum ether, (b. p. about 40°), *absolutely dry* gaseous hydrobromic acid is introduced until a precipitate is no longer formed. The pure white hydrobromide of cineol formed is rapidly collected with a suction pump, and washed with cold petroleum ether. Into the filtered-off liquid, hydrobromic acid is again introduced, any precipitate formed is collected separately, and then added to the bulk. For the purpose of removing the petroleum ether, the cineol hydrobromide is left standing for a quarter of an hour in a vacuum; it is then rinsed with a little alcohol into a cassia flask, and decomposed with water. The cineol separated off is brought into the neck of the flask by the addition of more water, and the quantity of the oil read off the scale. By multiplying with 10, the cineol content of the oil employed is obtained in *per cent.* by volume."

This method has the same drawback as the Phosphoric Acid method, namely, rapid decomposition of the addition product. Moreover, the procedure for obtaining the cineol hydrobromide is a very complicated one, and is not suitable, therefore, for ordinary practical purposes.

3. *The Potassium Permanganate Method* is based upon the fact, that, in the cold, cineol remains practically unattacked by potassium permanganate, whereas the remaining constituents of the oils in question (eucalyptus oil and cajuput oil) are oxidized into soluble compounds. The process is carried out as follows:—"10 cc. of the oil under examination are placed in a narrow-necked flask, cooled with ice-water and shaken with a gradually added 5 to 6 *p. c.* solution of potassium permanganate, until the latter is present in excess. The mixture is then left standing in ice-water for from 12 to 18 hours with occasional shaking, after which the manganese peroxide which has separated out is brought to solution by means of a careful addition of sulphurous acid (or sodium bisulphite + hydrochloric acid). The unattacked oil (eucalyptol) is brought into the neck of the flask, pipetted into a graduated tube, washed with a little alkali, and estimated volumetrically. Its sp. gr. should be 0.929 to 0.930 (15°); it should be inactive, and dissolve in 3.5 vols. 60 *p. c.* alcohol at 25°."

We have not investigated this method personally, but are rather willing to ac-

cept the criticism as published in Schimmel & Co.'s Semi-Annual Reports, for April, 1913, p. 62, containing results of experiments on known mixtures of cineol with pinene and terpineol. For instance, a mixture containing 25% cineol and 75% pinene, when estimated by this method, showed a cineol content of 95%; a mixture of 50% cineol and 50% terpineol, on the other hand, yielded only 30% cineol. Time does not permit us to enter into a more complete discussion of these results.

4. *Resorcinol Method*, or more correct, *Resorcinol Methods*, since there is an *"original"* method as described in Schimmel & Co.'s Reports for October, 1907, in Gildemeister & Hoffmann's "Volatile Oils," 1913, p. 601, and as proposed for the inclusion in the Ninth Revision of the U. S. Pharmacopœia, and also a "Modified Resorcinol Method" as given in Schimmel & Co.'s Reports for April, 1908.

The "original" method is based on the fact that cineol forms an addition product with resorcinol, which is soluble in an excess of concentrated resorcinol solution.

The process is carried out as follows:—

"To 10 cc. of oil contained in a 100 cc. cassia flask enough 50 p. c. resorcinol solution is added to fill the flask about four-fifths. For five minutes the mixture is thoroughly shaken, and then that portion of the oil which has not gone into solution is driven into the neck with resorcinol solution. Any oily particles adhering to the walls of the flask are caused to rise to the surface by rotating the flask or gently tapping it. After the resorcinol solution has become perfectly clear, which usually requires several hours, the volume of oil remaining is read off, the cineol content ascertained by subtracting this amount from 10 and the resultant multiplied with 10 in order to obtain the percentage by volume. Oils very rich in cineol are advantageously diluted with an equal volume of turpentine oil since the cineol-resorcinol occasionally crystallizes from concentrated solutions thus rendering futile the entire process."

It soon became apparent, however, that this method gave too high results, for the reason that constituents of eucalyptus, other than cineol, are also soluble in the resorcinol solution, and further investigation of the subject, led to the "Modified Resorcinol Method," which consists in distilling the oil of eucalyptus at such a rate that only one drop distills over in one second, collecting the portion distilling between 170° and 190° C., and subjecting this portion to the estimation by the above described Resorcinol Method.

We have examined a number of oils, both by the "original" and "modified" Resorcinol Methods, and have reserved our criticism of these for the latter part of our paper.

Many a chemist's patience has been sorely tried by the Phosphoric Acid method of separating cineol, as outlined in the U. S. P. VIII; and, therefore, the Resorcinol Method, as proposed originally by Schimmel & Co., and as described in the last edition of Gildemeister & Hoffman's "Volatile Oils," seemed to afford an easy and accurate means of estimating cineol. However, it became evident at the first application of this method, that the new process was not above suspicion, especially when some eucalyptus oils, persistently refusing to form a semi-solid precipitate with phosphoric acid, showed unusually high cineol content when assayed by the Resorcinol Method.

The logical idea then suggested itself of trying arsenic acid instead of phos-

phoric acid, with a view of obtaining a more stable addition product, and the results so obtained exceeded our expectations. Later, a search through the literature revealed the fact that the idea was not original with us, since cineol arsenate became the subject of a patent as early as June 20, 1901 (German Patent No. 132606, U. S. Patent No. 705545), and according to Thoms & Molle (Arch. der Pharmazie, 242 (1904), p. 172), they used arsenic acid in February, 1901, for the purification of cineol as well as for its separation from various fractions of the Oil of Bay Laurel. Nevertheless, we justly claim the credit for being the first to apply arsenic acid to the *quantitative estimation* of cineol.

We found that by adding approximately an equal volume of an 85% solution of arsenic acid to cineol, a white, solid, crystalline substance resulted, which is sufficiently stable to permit handling it in the air, and which is decomposed by hot water into its components, that is, cineol and arsenic acid. A compound obtained by mixing equimolecular quantities of cineol (152.98) and Arsenic Acid (140.9) was tested for its stability when exposed to air at ordinary room temperature with the following result:—

5 hours in open air Temp. 25° C.—Loss: 2.9%
22 hours in open air Temp. 25° C.—Loss: 6.0%
29 hours in open air Temp. 25° C.—Loss: 7.0%
45 hours in open air Temp. 25° C.—Loss: 8.4%
69 hours in open air Temp. 25° C.—Loss: 9.6%

The determination of cineol in cineol-bearing oils by means of arsenic acid is carried out as follows:—

Deliver from a pipette 10 cc. of the oil into a glass dish (preferably a round bottom one) of 50 cc. capacity, which is imbedded in finely cracked ice. Add 10 cc. of concentrated arsenic acid (containing about 85% arsenic acid; (see "Note" below) and stir until precipitation is complete. When the mixture ceases to congeal further, allow to stand ten minutes in the ice. *At this point,* if the mixture forms a hard mass, indicating an oil rich in cineol, 5 cc. of purified petroleum ether should be added, and the mass mixed well; transfer immediately to a hardened filter paper* by means of a pliable horn spatula; spread evenly over the surface of the paper and lay a second hardened filter paper over the top. Outside of the hardened filters, place several thicknesses of absorbent or filter paper, and transfer the whole to an ordinary letter press, bringing to bear all the pressure possible for about one minute. Change the outside absorbent papers and press again, repeating the operation, if necessary, until the cineol arsenate is apparently dry, and separates readily when touched with a spatula. The pressing is *not* complete when a hard mass remains which is broken up with difficulty; the method usually requires two changes of filter paper, pressing each time for about two minutes; if left too long in the press the compound may decompose. Now, transfer completely the compound by means of the horn spatula to a glass funnel inserted into a 100 cc. Cassia flask with neck measuring 10 cc. graduated in 1/10 cc. Wash the precipitate into the flask with a stream of hot water from a wash bottle, assisting the disintegration with a glass rod. Place the flask in boiling water and rotate until the compound is thoroughly broken up; add enough water to cause the cineol to rise into the neck of the flask, cool to room temperature

* In our work we found most useful Schleicher & Schüll's hardened filters No. 575, 18½ cm. diam.

and read off the volume; on multiplying the latter by 10, the percentage of cineol in the oil is obtained.

In judging whether or not petroleum ether should be added, the following rule should be observed; add enough petroleum ether to soften the cineol arsenate, so as to obtain a plastic mass; the quantity necessary never exceeds 5 cc., and decreases with oils containing less than 80% of cineol. The object of adding petroleum ether is merely to soften the hard mass and to aid in the separation of the non-cineol constituents of the oil; a large excess of petroleum ether will decompose the compound.

The above method is applicable directly to all oils containing above 50% of cineol; in oils containing lower proportions of cineol the precipitate is not solid enough to permit convenient handling; and if the cineol content drops below 25%, the separation of cineol arsenate is not quantitative. We have found that the addition of an equal volume of eucalyptol to such oils (i. e., mixing 5 cc. of the oil with 5 cc. of eucalyptol) successfully overcomes this difficulty; it then, only becomes necessary to subtract from the volume of cineol, as observed in the neck of the flask, 5 cc., and to multiply the difference by 10, in order to obtain the percentage of cineol in the oil.

Note.—The arsenic acid may be obtained in commerce in crystalline form; and may be dissolved in water in such proportion that the resulting solution has the S. G. of 2.173 at 25°, (corresponding approximately to 85% arsenic acid) or it may be conveniently prepared in the laboratory as follows:—

Place in a porcelain evaporating dish 50 cc. Nitric Acid S. G. 1.142, and add 60 gms. arsenic trioxide in small portions, stirring continuously; after the reaction becomes less violent, heat over Bunsen burner until the oxidation is complete and the excess of nitric acid is evaporated; test for freedom from both arsenic trioxide and nitric acid; filter and evaporate to about 100 gms. The resulting solution contains about 85% of arsenic acid (H_3AsO_4.)

In order to test the reliability of the method, we have prepared, to begin with, various mixtures of cineol with turpentine oil, and ascertained their cineol content in the manner above described, with the following results:—

1. 50 vol. % Cineol+50 vol. % Turpentine oil; found 49.5%; 50% Cineol
2. 60 vol. % Cineol+40 vol. % Turpentine oil; found 59 %; 60% Cineol
3. 75. vol. % Cineol+25 vol. % Turpentine oil; found 74 %; 75% Cineol

As stated above, we found that the application of the method to mixtures containing less than 50% cineol is not practicable; and, since adding cineol to such mixtures would have amounted simply to testing known mixtures containing a higher percentage of cineol, we have omitted this part of investigation from the line of our work as originally planned.

In order to test the applicability of our method to various oils containing cineol, we have collected from several sources a number of samples of such oils and subjected them to assaying by the arsenic acid method, comparing our results with those obtained by the Resorcinol Method.

The comparison was carried out both on original oils and on fractions distilling over between 170° and 190° C., as outlined in Schimmel & Co.'s Report, April, 1908 ("Modified Resorcinol Method").

For the purpose of determining the purity of cineol separated by the arsenic acid method, several portions of cineol, obtained in the course of assays of *original* oils, were mixed and subjected to physical examination with the following results:—

S. G. at 25° C.—0.9218; Melting Point—1° C.; Optical Rotation +0°13′.

On the other hand, being already familiar with the fact that results obtained by the Resorcinol Method on original oils are not reliable, we examined only that cineol which was obtained by the "modified Resorcinol Method," and which was thus subjected to considerable purification, at first by distilling the oil, and then by distilling with steam the resorcinol solution containing the soluble portion of the above distillate. Cineol collected in this manner from a number of Resorcinol solutions possessed the following properties:—

S. G. at 25° C.—0.9242; Melting Point—3° C.; Optical Rotation +0°7′.

The criterion of a pure cineol, according to the U. S. P., being S. G. at 25° C. —0.921 to 0.923, Melting Point—1° C.; and optically inactive, the purity of cineol obtained by the arsenic acid method, as evidenced by its physical properties, shows conclusively that none of the constituents of oil of eucalyptus other than cineol are precipitated by the arsenic acid, and that the precipitate of cineol arsenate can be freed, with comparative ease, from the non-cineol portion of the oil in question.

Results of assays made by us on eighteen samples of various oils are incorporated in the accompanying table.

Close agreement of results obtained by the arsenic acid method on original oils with those obtained on the distillate, collected between 170° and 190° C., speaks well for their correctness. An additional argument in favor of this contention is the fact that these results, from the very nature of the process, tend to be somewhat high, rather than low; observing, at the same time, that results yielded by the modified Resorcinol Method are invariably higher than those obtained by our method, we must necessarily conclude, that the latter represent more nearly the true cineol content of an oil; remembering in addition the almost quantitative yield of cineol from its mixture with various proportions of oil of turpentine when precipitated by arsenic acid (see previously), we feel justified in stating that our method gives results which represent the true cineol content within the limits of an experimental error, which in this case does not exceed 2%.

We regard the results of our experiments on known mixtures of cineol with oil of turpentine as conclusive, and our method as directly applicable to all varieties of cineol-bearing oils, for the reason that in such oils, cineol is the only constituent precipitated by the arsenic acid.

The purity of cineol, as well as the close concordance of results obtained by our method before and after distillation, show that oxygenated constituents, other than cineol, are not precipitated by arsenic acid, since fractions distilling above 190° C. carry most of such compounds, and their removal would have resulted in a percentage of cineol lower than that obtained in the assay before distillation, if the opposite were the case.

On the contrary, the numerous experiments carried out by Schimmel & Co. in assaying by the Modified Resorcinol Method, mixtures composed of cineol and fractions of eucalyptus oil distilling *below* 170° and *above* 190° C., do not prove the reliability of this method, since such mixtures do not contain the non-cineol constituents distilling *between* 170° and 190° C., some of which unquestionably are soluble in a 50% resorcinol solution; the latter may be seen from the fact that, in the large majority of oils examined by us, the Resorcinol Method (modified) gave higher results than the Arsenic Acid method.

No.	Name of Oil	S. G. at 25°	O. R.	Arsenic Acid Method		Resorcinol Method		Remarks
				Direct	After Distill.	Direct	After Distill.	
1	Eucalyptus Globulus.....	0.9187	+0° 50′	84% 82%	83%	88%	88%	Boiling-point, 170°-174°
2	Eucalyptus Austral.....	0.9108	+0° 43′	78% 78%	78.8%	90%	85.5%	No distillate below 170° Cineol Fraction=95%
3	Eucalyptus	0.9171		85%	85%	88%	88%	Distilled completely between 170°-190° C.
4	Eucalyptus Bosisto.....	0.9158		84%	84%	90%	90%	Distilled completely between 170°-190° C.
5	Eucalyptus Alger.....	0.9176	+5° 15′	58%	49.6%	see foot-note	57% 55.5%	Fraction below 170°-14.6 cc., contained 8.32 cc. Cineol "Cineol Fraction"=73 cc. (From 100 cc. oil)
6	Eucalyptus Austral.....	0.9182		84% 84%	84.48%	90%	91%	No distillate below 170° "Cineol Fraction"=96%
7	Eucalyptus Amygdalina.....	0.8640	—44° 10′	see foot-note	14.7% 14.7% 15.6%	36%	14.7%	Dist. below 170°=1.5% "Cineol Fraction"=82%
8	Eucalyptus Globulus.....	0.9171		85%	86%	90%	89%	No distillate below 170° "Cineol Fraction"=95%
9	Eucalyptus Amygdalina.....	0.8680	—36° 38′	no precip-itate	5.0% 6.0%	54%	14.8%	Dist. below 170°=2.6% "Cineol Fraction"=78%
10	Eucalyptus Dumosa.....	0.9145		78% 76%	74% 75%	94%	78%	No distillate below 170° "Cineol Fraction"=95%
11	Eucalyptus Globulus.....	0.9179		83%	84.48%	92%	91%	No distillate below 170° "Cineol Fraction"=96%
12	Eucalyptus Austral—50-60%.	0.9254	+4° 24′	64% 65%	66.3%	90%	66.3%	Dist. below 170°=2.6% "Cineol Fraction"=78%
13	Eucalyptus Austral—70-80%.	0.9210		77.5% 78%	78%	92%	87%	No distillate below 170° "Cineol Fraction"=91%
14	Eucalyptus Austral—80-85%.	0.9188		83.5%	84.5%	92%	90%	No distillate below 170° "Cineol Fraction"=96%
15	Eucalyptus Austral.....	0.9178		82% 82% 83%	83%	86%	88%	No distillate below 170° "Cineol Fraction"=95%
16	Eucalyptus	0.9156	+0° 18′	84.5% 85%	86%	88%	88%	No distill. below 170° "Cineol Fraction"=94.5%
17	Cajuput Native.....			60% 61%	49.8% 50.7%	73%	54%	No distillate below 170° "Cineol Fraction"=67% Fraction above 190° contained Cineol
18	Camphor			55%	53%	55%	53%	Dist. below 170°=22% (contained Cineol) "Cineol Fraction"=87%

Foot-note.—Insufficient quantity of oil to complete determinations.

An additional error in the Resorcinol Method is contributed by the solubility of oil of eucalyptus in water, which dissolves from 4% to 5% of this oil, whereas, cineol is almost insoluble; it could not be argued, therefore, that lower results obtained by our method could be due to the solubility of cineol in water.

We have adduced sufficient proof to show that the solubility of certain constituents of cineol-bearing oils must necessarily lead to a higher than actual cineol content when estimated even by the modified Resorcinol Method; it, therefore, becomes superfluous to discuss the total lack of reliability of the original Resorcinol Method in the form proposed for the inclusion into the forthcoming edition of the U. S. Pharmacopœia. Some oils, such as *eucalyptus amygdalina*, may, when assayed by this method, be accepted as a U. S. P. oil of eucalyptus, especially if a small quantity of cineol were added to them. Likewise, oils rich in oxygenated constituents may be freed from a large proportion of their cineol content by freezing and then offered in commerce as a U. S. P. product.

Schimmel & Co., in introducing the modified Resorcinol Method, assume that the fraction of oil of eucalyptus distilling between 170° and 190° carries all of the cineol contained in the oil. We admit that such an assumption may be correct in the majority of oils; we have encountered, however, some oils in which the presence of cineol was proven in portions distilling either below 170° or above 190° C. (see table, oils No. 5, No. 17, No. 18); in such oils, therefore, a certain portion of cineol would not be included into the estimation. Thus, while the modified method is, in a way, an improvement on the original method, yet at the same time, it introduces a new source of error.

Among eighteen samples of cineol-bearing oils, we found only one in which concordant results were obtained by the Resorcinol and Arsenic Acid methods (see table, oil No. 18). We regard this single exception as a final and conclusive proof of the unreliableness of the Resorcinol Method in general, and of the superiority of the Arsenic Acid Method.

SUMMARY.

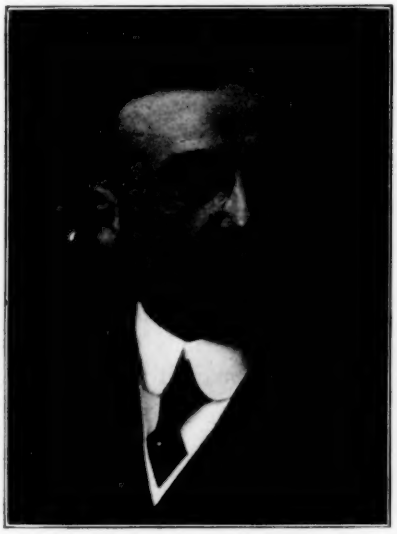
1. Arsenic Acid forms with cineol an addition compound which is sufficiently stable for all practical purposes.

2. While the Arsenic Acid method cannot be included among those scientifically exact methods, which give results varying only slightly, even in the hands of a novice, nevertheless, we are convinced that this method is superior to any method yet proposed for the determination of cineol, being directly applicable to all cineol-bearing oils, giving results which are concordant within 2%, and representing, for all practical purposes, the true cineol content of an oil.

3. The Resorcinol Method, as slated for the U. S. P. IX, should not be adopted by the Revision Committee, for it will unquestionably lead to the introduction into commerce, of low grade eucalyptus oils; it would be far better to retain the present unsatisfactory phosphoric acid method, which undoubtedly is responsible for the fact that the majority of eucalyptus oils at present on the market possess a high cineol content, as seen from the analysis of samples obtained by us. We may suggest, however, that the Sub-Committee on Volatile Oils investigate the reliability of the Arsenic Acid method with the view of including it in the forthcoming edition of the Pharmacopœia.

Research Laboratory, Bristol-Myers Co., New York.

NATIONAL ASSOCIATION OF MANUFACTURERS OF MEDICINAL PRODUCTS.



H. C. LOVIS, M. D.

The fourth annual meeting of this association was held at the Hotel Waldorf-Astoria on February 8 and 9.

The principal features of the meeting were the address of the President, Dr. Henry C. Lovis, the address of the Executive Committee, and the papers read by Dr. Dohme on "Paternalism in Government;" by F. B. Kilmer, on "Cultivation of Medicinal Plants," and by F. W. Bradford, on "Revision of U. S. Patent and Trade-Mark Laws."

The address of the President described the development of the world's commerce during the past year and congratulated the members upon the wisdom of our forefathers in avoiding "entangling foreign alliances," in view of the deplorable condition of Europe at the present time. He analysed the rise in prices caused by the war and said the lesson to be drawn from them, was that we should endeavor to relieve our country of its dependence upon other countries for supplies and he spoke of the necessity for protecting our manufacturers against the competition of foreign manufacturers.

The condition of our country was fundamentally sound and there was every prospect of great and profitable business for every one.

He referred to the new Currency Law as an efficient stabilizing influence to sound business conditions; to the prosperity of our railroads; to the opening of the Panama Canal and to the development of foreign markets, and strongly insisted upon our need of American ships to keep our money at home,—$270,000,000 of which now goes into the hands of foreign companies. He congratulated the association upon the passage of the Harrison Anti-Narcotic Bill and recommended the continued representation of the Association in the National Drug Trade Conference. He advocated the support of the Price Protection measure, the Variation Clause of the Food and Drugs Act, one-cent letter postage, and extended his hearty thanks to the officers and members and to the drug journals for their coöperation in the work of the Association.

The report of the Executive Committee recommended the rebate of $100.00 in the annual assessment; advocated the establishment of a system of compiling, registering and publishing lists of trade-names and trade-marks, and of amicable adjustment of differences relating to the same, and protested against increase of freight-rates to the Pacific coast.

The committee also recommended the passage of resolutions commending the Harrison Anti-Narcotic Bill; one-cent letter postage; the revision of the patent and trade-mark laws; and opposed any change of the variation clause of the food and drugs act; and the adoption of the German bi-chloride tablet by the Pharmacopœial Revision Committee.

It advocated changes in the laws of the states to bring them into conformity with the Harrison law and commended the efforts of the Philadelphia Drug Exchange, to remedy the injustice imposed by Section 11 of the Food and Drugs Act.

The retiring officers were re-elected for the ensuing year, and the Secretary, Mr. C. M. Woodruff, was voted an honorarium of $500.00.

The meeting was addressed by Prof. Henry C. Hynson, Samuel C. Henry, Charles P. Tyrrell and George C. Hall.

The banquet was on Tuesday evening at the Waldorf-Astoria. President Lovis presided and the speakers were Rev. Dr. Cadman, Congressman Chandler and Luther B. Little.

Contributed and Selected

THE PHARMACOGNOSY OF THE MEDICINAL RHAMNUS BARKS.

E. N. GATHERCOAL, PH. G.

(Continued from page 207.)

RHAMNUS CALIFORNICA BARK.

(The fresh material used for this study was kindly supplied by Dr. Albert Schneider and Mr. Theodore Payne of California.)

The sections from the terminal bud exhibit a total diameter of 2 mm. of which the pith constitutes one-half, the bark 400 microns on either side and the wood circle 100 microns. The structure corresponds very closely with that of similar sections from *Rhamnus purshiana.* The mucilage sacs are especially abundant in the pith, occupying about two-thirds of the total area and apparently containing large rosettes of calcium oxalate, 30 to 60 microns in diameter, embedded in the mucilage. The contents of the pith parenchyma cells are purplish-brown in color.

In sections just below the bud the collenchyma of the outer portion of the middle bark is more distinctive than in the *Rhamnus purshiana.* Few mucilage cells are found in bark or pith, but large rosettes are very abundant and the primary bast is becoming differentiated as an almost continuous band. The phloem parenchyma cells often contain dark brown or purplish contents, as indeed do nearly all the parenchyma cells of the bark except the crystal cells. The cambium is evident and the wood circle is 200 to 300 microns wide.

At 15 mm below the bud the structure is very similar to that of *Rhamnus purshiana.*

In a four-year-old stem the bark exhibits the first evidences of secondary bast, and as yet no stone cells are present in the middle bark. The strongly differentiated character of the collenchyma is very evident.

Sections from the mature bark show a structure strikingly like that of Rhamnus Purshiana.

No distinction in the character of the cork layer could be determined in the two barks.

The collenchyma of *Rhamnus californica* bark observed in specimens from several plants, is larger celled than in Rhamnus Purshiana, these cells reaching a maximum of 100 microns tangentially by 20 microns radially, but averaging about 45 microns by 12 or 15 microns, the walls much thickened. The masses of stone cells in the middle bark are very similar in the number, size and character of their cells to those in similar sections of Rhamnus Purshiana. Rosettes are very abundant and the smaller prismatic crystals plentiful.

In the inner bark the secondary bast is similar to that of Rhamnus Purshiana, strands rather fewer-celled and the fibers somewhat smaller. In inner bark 1 mm. in width, there are 6 tangential rows of bast. The medullary rays in transverse section, are from 1 to 5 cells wide, but mostly 2 and 3 cells wide. In a section 6.7

mm. long there were 28 rays, 4 of them 1 cell wide, 12 of them 2 cells wide, 10 of them 3 cells wide, 1 of them 4 cells wide and 1 of them 5 cells wide. In tangential view the rays are rather broadly elliptical, mostly 3 or 4 cells wide (60 to 100 microns) and from 10 to 30 cells long (150 to 500 microns). The widest I observed was 5 or possibly 6 cells wide, though Farwell found them 7 cells wide. As to the frequency of the rays in the two barks, they are undoubtedly more frequent in the Rhamnus Purshiana. In an average section of Rhamnus Purshiana there were 46 rays in 7 mm. as against 28 rays in 6.7 mm. of *Rhamnus californica* bark. The ray cells in transverse section are sometimes slightly elongated radially, again nearly square and again slightly elongated tangentially. In tangential view they are mostly rounded or irregular. Crystals are not present in the rays.

The waviness of the cambium edge, observed in transverse section, due to a shrinking inward at each medullary ray is a striking feature. It is best seen in rather thick sections of the bark, which has been dried and then softened in dilute alcohol, and mounted in water or phloroglucin and hydrochloric acid. But even in thin sections swollen in potassium hydrate solution this feature may yet be observed. The waviness is not seen in sections of the bark attached to the wood nor in very young bark that has been dried and afterwards softened. It was observed, however, in bark 4 years old.

Potassium hydrate solution colors at once the contents of the medullary ray cells a pinkish-red for a short distance inward from the cambium, and also the phloem parenchyma of the latest growth. After a few minutes, especially in sections cut from dried bark, and mounted directly in the potassium hydrate solution, the entire inner bark with the exception of the bast acquires the pinkish color.

RHAMNUS CAROLINIANA BARK.

(The material for this study was obtained from the Biltmore Nurseries of Biltmore, N. C., and from living plants in the author's garden in Oak Park.)

In transverse sections from the base of the bud of a width of 2.7 mm., the bark constitutes 540 microns and the wood circle 180 microns either side and the pith has a diameter of 1.17 mm.

The structure of these sections is very similar to sections from the base of the bud of *Rhamnus purshiana.* The epidermis consists of small, nearly cubical brown cells with some one-celled, curved or wavy trichomes.

In the middle bark, the outer portion consists of about 8 rows of small rounded parenchyma cells with living contents including chlorophyll grains. The inner portion consists of parenchyma cells containing vast numbers of rosette aggregates of calcium oxalate and with very many mucilage sacs imbedded in it.

The inner bark is narrow and consists of an outer layer of small-celled phloem and a rather wide typical cambium.

The wood circle is like that of *Rhamnus purshiana.*

The pith contains 14 mucilage sacs, the largest 450 microns across and the total occupying two-thirds of the area of the pith. Many rosette aggregates are present in the parenchyma.

In a three-year-old stem, 30 cm. below the terminal bud, measuring 6.5 mm. across, the bark constituted .65 mm. on either side.

The cork was 8 to 10 rows of cells (100 microns) in width, the cells closely resembling those of *Rhamnus purshiana.*

The middle bark is 450 microns wide, the outer portion of collenchyma, the inner portion of typical parenchyma, with a few small mucilage sacs and some rosettes. Small scattered bundles of unlignified primary bast lay at the inner edge. No stone cells are present.

The inner bark is narrow. No secondary bast has been formed.

Sections of the bark from a stem 15 mm. in diameter and 5 years old were 1 mm. wide, of which the cork layer constituted about 100 microns, the middle bark 400 microns and the inner bark 500 microns. The cork was roughened and flaked and in patches up to 18 rows of cells thick.

In the middle bark, the largest mass of stone cells observed was 300 microns long. The stone cells show pores, stratifications and lumen quite distinctly.

The inner bark contains 1 or 2 rows of small bast bundles, typically like the early *Rhamnus purshiana* bundles. The medullary rays are elliptical in tangential view, the widest observed being 4 cells wide, but mostly 2 and 3 cells wide. They are rather short, the longest observed being 20 cells long. The ray cells are mostly square or slightly elongated radially. The rays are numerous, 30 rays in a transverse section 3.4 mm. long, thus being twice as numerous as in *Rhamnus californica* bark and a half again as numerous as in *Rhamnus purshiana* bark.

No evidence of a waviness along the cambium edge was observed.

With potassa solution, the parenchyma cells of the inner bark acquire a pink-red color.

RHAMNUS WIGHTII BARK.—(After Hooper.)

Masses of stone cells are found in the middle bark and rosette aggregates of calcium oxalate crystals are abundant in the parenchyma cells.

The inner layers consist of pale yellow bast fibers running through a mass of cells containing yellow brown color. The bast bundles are surrounded by numerous rhomboidal crystals. The medullary rays and inner cellular layers are filled with starch and a yellow coloring matter acquiring a brilliant red with potash solution.

RHAMNUS FRANGULA BARK.

(The fresh material used for this study was collected in the dormant season from cultivated plants in the south parks in Chicago and in the author's garden in Oak Park, Illinois.)

The sections obtained from the terminal bud correspond very closely with those

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(Detail of cuts on succeeding page.)

RHAMNUS FRANGULA AND RHAMNUS CATHARTICUS.

Fig. 23—Transverse section of the bark from a 9-year-old stem of *Rhamnus frangula*. A—outer bark, B—middle bark, C—inner bark. 1—cork, the outermost rows compressed; 2—collenchyma; 3—middle bark parenchyma with numerous rosettes of calcium oxalate crystals; 4—the earliest secondary bast; 5—secondary bast of later growth with accompanying crystal fibers; 6—phloem consisting mostly of parenchyma with some rosettes of calcium oxalate; 7—medullary ray, practically free from crystals; 8—cambium. (X 200, reduced ½.)

Fig. 24—From the inner bark of *Rhamnus frangula*, in transverse view. 1—bast fibers; 2—crystal fibers; 3—phloem parenchyma, one cell showing a rosette aggregate, another with living cell contents and a third with pores in the bottom wall. (X 600, reduced ½.)

Fig. 25—The inner bark of *Rhamnus frangula* in tangential view. 1—medullary ray; 2—phloem parenchyma; 3—bast fibers; 4—crystal fibers. (X 600, reduced ½.)

Fig. 26—Transverse section of the bark *Rhamnus catharticus* from a 4-year-old stem. A—outer bark, B—middle bark, C—inner bark. 1—cork, many rows of narrow cells much elongated tangentially; 2—collenchyma of a few poorly differentiated rows; 3—parenchyma with some calcium oxalate rosettes; 4—unlignified primary bast; 5—lignified secondary bast with crystal fibers; 6—phloem parenchyma; 7—medullary ray; 8—cambium. (X 200, reduced ½.)

Fig. 27—Tangential view from the outer and middle barks of *Rhamnus catharticus*. 1—cork; 2—phellogen; 3—parenchyma with rosette aggregates; 4—primary bast in interweaving strands .(X 600, reduced ½.)

Figs. 28 and 29—Tangential views from the inner bark of *Rhamnus catharticus*. 1—medullary ray; 2—bast fiber; 3—crystal fiber; 4—phloem parenchyma with strongly beaded walls and occasional rosettes of calcium oxalate crystals. (X 600, reduced ½.)

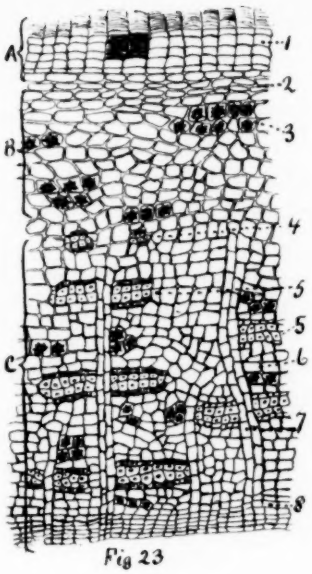

Fig. 23

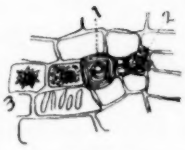

Fig. 24

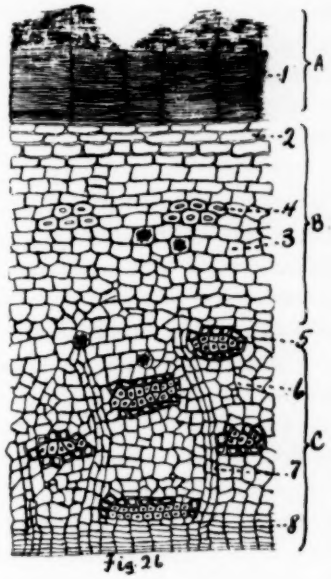

Fig. 26

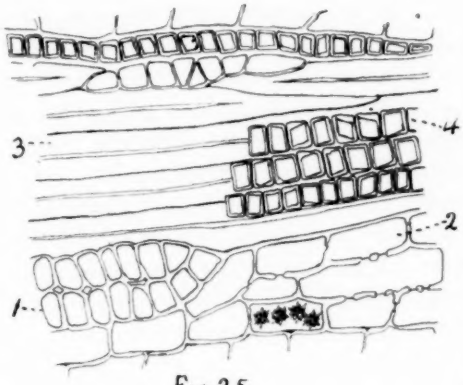

Fig. 25

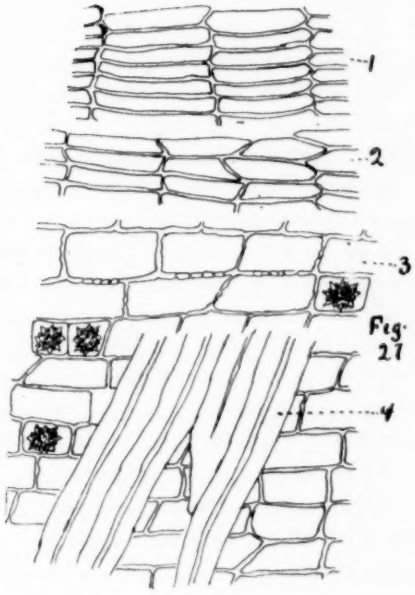

Fig. 27

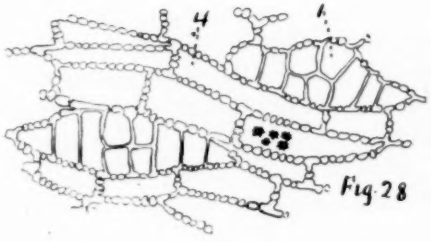

Fig. 28

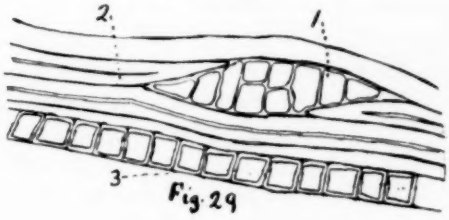

Fig. 29

from *Rhamnus purshiana* bark, likewise no distinctions could be made in sections from each plant just below the bud, except possibly a somewhat less number of mucilage sacs and of rosette aggregates of calcium oxalate in the *Rhamnus frangula*. It is noteworthy, however, that already, in these sections from the base of the bud, cork has made its appearance, for in some portions of the section three layers of typical cork cells were present beneath the epidermis, in other portions none, though a phellogen can be distinguished throughout the whole circumference. The cork cells are mostly 15 microns tangentially, 8 to 10 microns radially, thin walled, the outer row with the walls red-brown in color.

In sections 2 mm. below the bud, the epidermis, with the abundant brown trichomes; the parenchyma, mucilage sacs, unlignified primary bast and rosette aggregates of the middle bark; the thin phloem layer and the medullary rays of the xylem all correspond with similar tissues in similar sections of *Rhamnus purshiana*. The brown-walled cork is in a continuous layer 3 to 5 cells wide.

At 5 cm. below the bud, the outer bark is 50 to 90 microns wide, the middle bark 200 microns across, the inner bark 160 microns wide, the wood circle 360 microns wide and the pith 1170 microns in diameter: total diameter of the stem 2.75 mm. There are no changes of note except a slight thickening of the cork, phloem and xylem layers. The medullary rays of the wood are lignified.

At 15 cm. below the bud the wood is of two seasons' growth, the width of the xylem circle being nearly 1 mm., the pith 1 mm. in diameter and the bark nearly ½ mm. thick. There are practically no changes in the bark. In another specimen from a three-year-old stem of a total diameter of 4.5 mm. the cork is irregular, up to 100 microns thick, the middle bark is 200 microns thick and the inner bark 200 microns thick. No secondary bast nor stone cells are present.

In a four-year-old stem the first evidence of secondary bast is found.

In a nine-year-old stem sectioned through a lenticel, the bark measures 1.07 mm. in thickness, of which 240 microns is outer bark, 200 microns middle bark and 630 microns is inner bark. The outer bark consists of exfoliating layers of small dark red cork cells intermixed with colorless cork cells and of a typical lenticel structure. The middle bark of parenchyma contains interweaving strands (one circle only) of non-lignified primary bast. No stone cells are present. The inner bark contains 5 irregular circles of bast bundles with the accompanying crystal fibers. The medullary rays as seen in tangential view are either a single row of cells or a narrow biconvex mass 2 or 3 cells wide. Small rosette and prismatic crystals in the parenchyma are very abundant. A few starch grains 3 or 4 microns in diameter are found in the parenchyma of medullary ray, phloem and middle bark.

Samples of the commercial drug gave sections very similar to the ones just described. The outermost layer of brown cork is seen to consist of several rows (8 to 20) of small rectangular cells, many with purplish contents, arranged one behind another in regular radial rows. The middle bark is of rounded or oval parenchyma cells with rather thin cellulose walls and granular contents and, it is worthy of note, that the parenchyma cells in the dried, cured bark often possess deep brown or purplish-brown contents. Many prismatic crystals and rosette aggregates are found in the cells of this layer. The inner bark is traversed radially by the rather numerous, nearly straight medullary rays up to 3 cells wide and

longitudinally by the conspicuous bast bundles with from 2 or 3 to 30 or 40 bast fibers in each. The individual fibers are narrow, thick walled, the cavity but a line and strongly lignified. Adherent to each bundle of bast are the typical crystal fibers.

Powdered Frangula, macroscopically, very closely resembles powdered Cascara, for in many samples of each powdered drug observed, the resemblance in color, odor and taste was so striking that they could not be differentiated by these means. Microscopically, nearly all the tissues in powdered Frangula closely resemble the corresponding tissues in powdered Cascara, though there is one very characteristic tissue, the stone cells, in Rhamnus Purshiana not present at all in Frangula. Therefore, it is not difficult to distinguish between these powders when separate, nor to detect Cascara in Frangula. It is somewhat more difficult to detect Frangula admixed with Cascara. However, the purplish contents of many of the cork cells of Frangula give to most of the fragments of cork, especially in a mount in chloral hydrate solution, a bright purplish color, while the fragments of cork from Rhamnus Purshiana remain of a brown or reddish-brown color.

RHAMNUS CATHARTICUS BARK.

(The material used for this study was obtained from cultivated plants from the Missouri Botanical Gardens of St. Louis, from the south parks of Chicago, and from plants in the author's garden in Oak Park, Ill.)

The stem of *Rhamnus catharticus* does not often possess a terminal bud. After the growth for the summer has ceased the terminal bud usually dies and that portion of the stem, 5 to 40 mm. long, projecting beyond the uppermost pair of axillary buds, hardens and becomes more or less pointed and thorny.

In transverse sections from about the middle of the lateral bud the epidermis corresponds to the similar epidermis of *Rhamnus purshiana* except that it is almost devoid of trichomes. A few appressed pairs are noted on the bud scales. The parenchyma of the middle bark consists of rounded cells up to 30 microns in diameter with thin, cellulose walls, cytoplasm, nucleus, chloroplasts and an occasional rosette aggregate of calcium oxalate. No mucilage sacs are present. Evidences of a primary bast are seen. Neither medullary rays nor cambium are present. The pith cells contain many large rosettes of calcium oxalate, but no mucilage sacs are present. Total diameter 1 mm.: cortex 175 microns wide, wood circle 125 microns wide, pith 400 microns in diameter.

In sections from the base of the bud the structure of the stem is very similar to that just described, except that the wood circle is wider, up to 200 microns, the xylem masses contain 10 or 12 tracheal tubes in a radial row and medullary rays are distinct.

The stem just below the uppermost pair of lateral buds has already attained a considerable maturity, as is evidenced by a growth of cork, of secondary bast, phloem and medullary rays and a lignification of the pith. The following is a brief description of sections 1 mm. below the base of the uppermost pair of lateral buds.

Epidermis—cells 15 microns radially, 20 microns tangentially, cuticle 8 to 10 microns thick. Cork—8 to 10 tangential rows of cells have a total width of 30 microns radially, the cells being 15 to 75 microns tangentially, the lumen but a

line and the walls thin and brown. Outer parenchyma—slightly collenchyma-like, the cells 15 microns radially, 15 to 30 microns tangentially. Inner parenchyma—isodiametric, up to 30 microns in diameter the cell contents brownish in color. Primary bast—in masses much elongated tangentially, 2 or 3 cells wide radially, the cells seldom exceeding 15 microns in diameter, somewhat compressed, with very thick cellulose walls. Secondary bast—1 or more rows of small bundles containing 3 or 4 to 15 or 20 cells tangentially and 1 to 3 cells radially, the fibers seldom exceeding 12 microns in diameter, with thick lignified walls. Crystal fibers—abundant; in structure and location the same as in *Rhamnus purshiana*. Medullary rays—distinct, 1, 2 or 3 cells wide. Phloem—parenchyma abundant; sieve and companion cells in small patches, the sieve plates difficult to differentiate. Wood circle—300 microns thick.

A transverse section at the base of the season's growth, measuring 2.3 mm. across, corresponds very closely to the above description, except that the wood ring is 400 microns in thickness.

The bark from a stem four years old measured 0.7 mm. in thickness. The structure of this bark differs but little from that described above, though the following changes may be noted: Cork—somewhat thicker and occasionally roughly split longitudinally. Primary bast—in small bundles rather widely separated by parenchyma. Secondary bast—in 3 irregular tangential rows. The prismatic crystals of the crystal fibers are very prominent. Rosette aggregates 10 microns across are common in the phloem.

Bark that would correspond with commercial bark if the drug was on the market may be described as follows: A specimen 2 mm. thick possessed a dense cork layer from 100 to 300 microns thick, dark yellow-brown in color and much fissured and flaked. The middle bark, 200 microns thick, consisted mostly of chlorophyll-bearing parenchyma, a few of the outer rows somewhat collenchymatous, with a few rosettes, a few widely separated primary bast strands and no stone cells. The inner bark 1620 microns wide at the thickest part, had 18 tangential rows of secondary bast, the character of each bast strand typically that of

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(Detail of cuts on succeeding page.)

RHAMNUS CHLOROPHORUS, CAROLINIANA, CROCEUS, AND CALIFORNICA.

Fig. 30—Transverse section of mature bark from *Rhamnus chlorophorus*. A—outer bark, B—middle bark, C—inner bark. 1—cork, the cells narrowed radially and elongated tangentially and the outermost rows compressed; 2—collenchyma; 3—parenchyma; 4—unlignified primary bast; 5—lignified secondary bast with accompanying crystal fibers; 6—phloem, consisting mostly of parenchyma and bearing no crystals; 7—medullary ray with numerous rosette aggregates of calcium oxalate; 8—cambium. (X 200, reduced ½.)

Fig. 31—Transverse section of the bark from a 5-year-old stem of *Rhamnus caroliniana*. A—outer bark, B—middle bark, C—inner bark. 1—cork, the outermost rows compressed; 2—collenchyma, strongly differentiated and with thickened cellulose walls; 3—parenchyma with rosettes and prisms of calcium oxalate; 4—masses of stone cells; 5—unlignified primary bast; 6—lignified secondary bast with crystal fibers; 7—phloem, consisting mostly of parenchyma and bearing small rosettes; 8—medullary ray without crystals; 9—cambium. (X 200, reduced ½.)

Fig. 32—Transverse section of the mature bark of *Rhamnus croceus*. A—outer bark, B—middle bark, C—inner bark. 1—cork, the outermost rows compressed; 2—collenchyma, tangentially elongated cells with thickened cellulose walls; 3—parenchyma with large rosettes of calcium oxalate crystals; 4—unlignified primary bast; 5—lignified secondary bast with crystal fibers, the bundles mostly separated from the surrounding parenchyma; 6—phloem, the cells sometimes compressed and consisting mostly of parenchyma with occasional rosettes of calcium oxalate; 7—medullary ray without crystals; 8—cambium. (X 200, reduced ½.)

Fig. 33—Transverse section of the bark from a 10-year-old stem of *Rhamnus californica*. A—outer bark, B—middle bark, C—inner bark. 1—cork, the outermost rows compressed; 2—collenchyma, strongly elongated tangentially with much thickened walls; 3—parenchyma with numerous rosettes and prisms of calcium oxalate; 4—a group of stone-cells; 5—unlignified primary bast; 6—lignified secondary bast with crystal fibers; 7—phloem parenchyma; 8—medullary ray. (X 200, reduced ½.)

Fig. 34—Transverse section of the inner bark of *Rhamnus californica* stem. 6, 7 and 8—same as in Fig. 33. 9—the cambium, the edge showing the waviness characteristic of this bark. (X 200, reduced ½.)

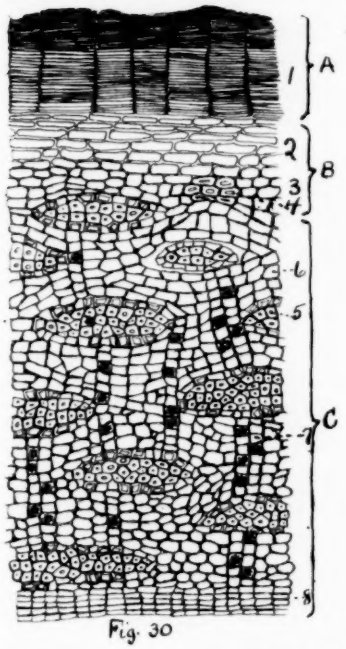
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Fig. 30

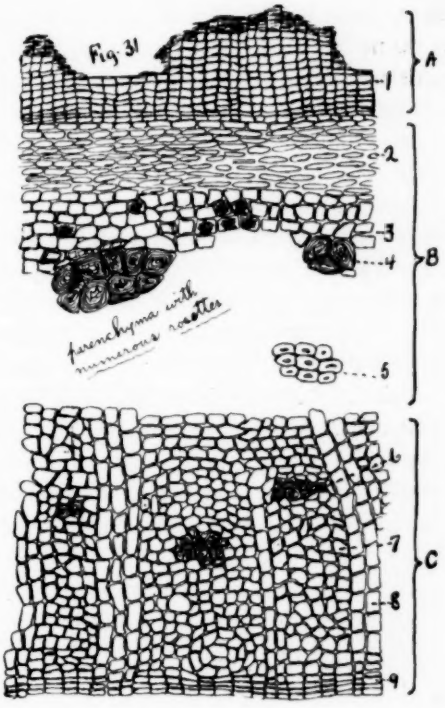
Fig. 31
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parenchyma with numerous raphides
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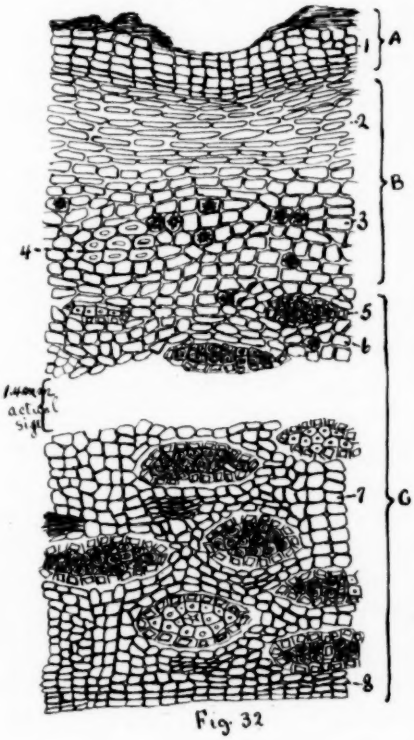
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1.4 mm. actual size
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Fig. 32

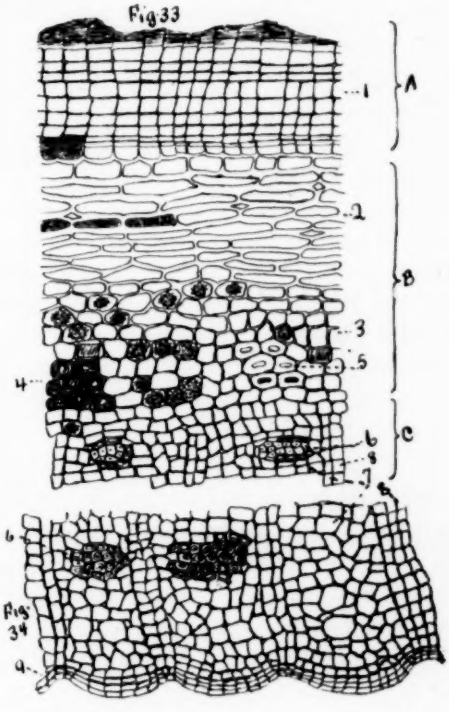
Fig. 33
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Figs 34
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the bast in Rhamnus Purshiana, though the bundles in *Rhamnus catharticus* are smaller, being mostly less than 200 microns (about 12 fibers) tangentially and less than 60 microns (4 fibers) radially, most of them but 2 fibers radially. The bast strands are inclined to unite with one another in each row and even form extensive tangential layers penetrated by the medullary rays. The phloem masses are distinct, though the sieve plates are differentiated with difficulty, most of the phloem cells being parenchyma, somewhat elongated longitudinally and with strongly beaded walls. Many cells with yellow contents are scattered in the phloem parenchyma and practically all the cells of medullary ray and phloem acquire a bright red color with potassa solution. The medullary rays are seldom 3 cells wide, mostly 2 cells or but 1 cell wide. The cells are elongated tangentially (up to 45 microns) rather than radially (up to 20 microns). In the tangential section of the bark, the rays are broadly elliptic because of this tangential elongation of the ray cells and because of the shortness of the rays longitudinally, about 6 to 10 cells.

It is to be noted that the bast strands easily separate from the surrounding parenchyma and in longitudinal section or in the powder the interlacing bundles appear in long masses with numerous fusiform spaces through which have passed medullary rays.

RHAMNUS CROCEUS BARK.

A specimen of bark 2.5 mm. thick possessed a rather thin cork layer, about 100 to 200 microns thick, rough and flaked and with cork cells nearly square or somewhat elongated tangentially (15 to 30 microns long). The middle bark (320 microns wide) consisted of an collenchymatous portion and an inner parenchyma layer. Rosettes and prisms of calcium oxalate were very abundant. There were no stone cells, but a few widely-separated strands of non-lignified primary bast.

The inner bark, 2 mm. wide, contained 18 tangential rows of secondary bast bundles, each strand like that of Rhamnus Purshiana bark. The bast bundles were from 8 to 30 cells (350 microns) tangentially and from 1 to 5 cells (80 microns) radially. The crystal fibers were very abundant, sometimes 2 rows about a bast bundle. The medullary rays, in tangential view, were elliptical, though not so broad as in *Rhamnus catharticus,* from 6 to 12 cells (100 to 250 microns) longitudinally and from 1 to 3 cells (20 to 80 microns) wide, though mostly 2 cells wide. The cells were nearly isodiametric, sometimes slightly elongated tangentially or radially, and nearly devoid of rosette crystals. In transverse view the rays were rather indistinct, but could be followed. There were 30 rays in 6 mm. of bark.

The phloem consisted mostly of parenchyma cells elongated longitudinally with square ends and non-beaded walls. Often the cells were much compressed radially between the bast bundles. Crystals were rather few except in the outer portion of the inner bark. All the parenchyma cells of the inner bark acquired a bright red color with potassa solution.

As in *Rhamnus catharticus* bark the bast strands easily separate from the surrounding parenchyma. In transverse section many of them fall out, leaving elliptical spaces and in longitudinal section and in the powder the interlacing bundles are in long masses with elliptical spaces through which passed medullary rays.

RHAMNUS CHLOROPHORUS BARK.

The dried bark from old stems soaked in dilute alcohol and sectioned, exhibited the following structure:—

Outer bark—100 to 300 microns thick, consisting of a brown cork layer supporting externally some thin lichen growths and internally a narrow disrupted phellogen. The cork cells are much elongated tangentially up to 75 microns, narrow radially, 8 to 10 microns, thin-walled, suberized.

Middle bark—200 microns thick, consists mostly of tangentially elongated collenchyma cells, up to 100 microns, but not more than 15 microns radially, with thick cellulose walls and long narrow cavities with brownish, granular contents. An occasional strand of much compressed unlignified primary bast is seen. No stone cells are present. Some rosette aggregates of calcium oxalate.

Inner bark—up to 1 mm. thick. Contains very many bundles of strongly lignified secondary bast separated by interlacing bands of phloem and indistinct medullary rays. There were 12 tangential rows of bast bundles in an inner bark 0.9 mm. thick.

The bast bundles are elliptic in transverse view, 2 to 5 cells wide radially and 5 to 20 cells tangentially, the fibers not more than 15 microns thick and each bundle invested by a single row of crystal fibers, typically those described under Rhamnus Purshiana. The phloem does not display sieve tubes well, but apparently consists mostly of parenchyma, the cells of which are rounded or oval, somewhat compressed tangentially and elongated longitudinally. Because of the number and close proximity of the bast strands and the indistinctness of the medullary rays, the narrow bands of phloem appear as though interweaving around and between the bast strands. The medullary rays are very indistinct in the transverse view, though they can be traced by a very slight difference in the shape of their cells from the surrounding parenchyma cells and by the presence of calcium oxalate rosettes. These crystals are numerous in the rays, but very scarce in the other tissues of the inner bark. In the tangential section the rays are elliptic in shape, 2, 3 or 4 cells wide at the broadest part, 10 to 30 cells long. They penetrate the bast strands and phloem parenchyma.

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FRESHLY PRECIPITATED RESINS IN AQUEOUS MEDIUM.

SAMUEL T. HENSEL, PH. G.

The object of this paper is to serve the two-fold purpose of suggestion to some future investigator, and to present a practical application of an observed phenomenon.

It is prompted by the reading of a query sent to the editor of one of our leading trade journals, which appears in the current issue of December, just received. The correspondent asks for information concerning the method to be employed in the preparation of a mixture of rose-water, glycerin and tincture of benzoin, a well-known and popular form of toilet cream.

Ten years ago, or more, the writer observed that the various resinous tinctures of the United States Pharmacopœia, such as the tinctures of benzoin, myrrh, asafetida, etc., were differently affected by the same volume of water; the permanence of suspension of the freshly-precipitated resin, depending upon the method employed in bringing these two substances together. The two following experiments were performed at that time.

Experiment No. 1:—Three ounces of distilled water were introduced into a four-ounce prescription bottle, and one half fluid-dram of tincture of benzoin was then carefully added, drop by drop, shaking the contents of the bottle vigorously after the addition of each drop.

Suspension of the precipitated resin, was apparently complete, until the addition

of the tenth or twelfth drop, when minute masses of agglutinated resin were observed floating throughout the mixture; these increased in size and number until apparently the greater part of the resin-content of the tincture was thrown out of solution.

The results obtained in this experiment prompted the following:

Experiment No. 2:—Three fluid ounces of distilled water were introduced into another four-ounce prescription bottle, and in this case, the procedure was the reverse of experiment No. 1, the entire one-half fluid dram of the tincture of benzoin being rapidly delivered upon the surface of the water contained in the bottle and permitted to rest upon the surface for the period of about five seconds, and then the mixture was vigorously shaken, as before.

The result in this case was the complete suspension of the resin, producing a permanent emulsion which showed no sign of change after the period of ten days.

More recently, in making a practical application of the result of these experiments, I find that as much as one and one-half fluid ounces of tincture of benzoin, may be delivered into the volume of twelve fluid ounces of water, in the manner described in experiment No. 2, and, if immediately incorporated with an equal volume of glycerin, a white and permanent emulsion will result.

Naturally, when a new or strange condition is observed, the question arises in the mind of the investigator, "What is the cause," and his hypothesis, then formed, will frequently assume a working phase which will lead him into a rational procedure, which will finally result in the solution of his problem.

I am not in a position at present to give the results of a systematic scientific investigation, but I have nevertheless formulated an opinion which may be of service to some other investigator, and help him to the solution of a problem of perhaps greater importance.

It is a well known fact that when alcohol is mixed with water, there is an immediate evolution of heat, which in the terms of physical chemistry, is the "Heat of solution," and is of positive sign (exothermic).

It is also known that water is porous, as has been demonstrated both by physicist and chemist, in recent years.

Now, in the case of experiment No. 1, the nuclei or minute sub-division of resin, as quickly as they are formed, are subjected to the influence of the heat of solution referred to; their surfaces becoming areas of adhesion, and, as their number increase with each successive drop, the subsequent agitation to which they are subjected has the effect of bringing the particles closer together. The element of time now intervenes, and, as they have increasingly shorter distances to travel,—their surfaces being still thermally affected,—they adhere, to form the masses observed in the experiment.

In the case of experiment No. 2, owing to the sudden development of the heat of solution, the inter-spaces of the water are thermally affected to the extent that numerous and infinitely small channels or tubes are created at the surface, into which the resin is temporarily deposited, which again, when vigorously shaken, are broken up into infinitely small particles, whose comparatively limited area are suddenly chilled, and thus rendered incapable of adhesion. Hence, a permanent suspension of the resin.

THE DEBT WHICH MEDICINE OWES TO SECRET PREPARATIONS.

OTTO RAUBENHEIMER, PHAR. D.

A great many preparations are in daily use as household remedies, and even as official preparations in the U. S. P. and N. F., which originated as secret medicines. The history and the evolution of these remedies is very interesting, and the writer, as teacher of History of Pharmacy in one of our Colleges, takes special interest in this subject, and takes pleasure in presenting the origin of some of these remedies.

The reason that some of the proprietary remedies are called "Patent Medicines" is that they were originally patented, and I herewith present a list of some of the remedies still used to-day together with the date when they were patented:

Haarlem Oil	1672	John Hooper's Female Pills	1743
Godfrey's Cordial	1720	Dr. James' Powder	1747
Bateman's Pectoral Drops	1726	Roche's Embrocation	1803
British Oil	1742	St. John Long's Liniment	1820

All of these old remedies are still extensively used to-day, in spite of the fact that some of them have been patented almost two hundred and fifty years ago. The "Female Pills" originated by John Hooper, apothecary and man-midwife as he was called, continue to have a very large sale.

Physicians and pharmacists have lent a helping hand in originating preparations which have greatly enriched our Materia Medica, for instance: Paregoric was originated by Dr. Le Mort, Professor of Chemistry at the University of Leyden, and the predecessor of the immortal Boorhaave, the founder of the celebrated Vienna Medical College. Wine of Opium originated by the celebrated English physician, Sydenham, Comp. Powder of Rhubarb originated by Dr. James Gregory, Professor of Medicine at Edinburgh. Calamine Ointment, originated by Dr. Daniel Turner, a celebrated surgeon at London. Powder of Ipecac and Opium, by Thomas Dover, doctor and pirate. In connection with this, permit me to point out that even in those early times some of the doctors were pirates! Solution of Potassium Arsenite, by the apothecary, Thomas Fowler. In connection with Fowler's solution, I beg to state that he originally kept its Arsenic content secret and named it *Mineral* Solution.

Perhaps the most important of this class is *Rochelle Salt*, which was accidentally discovered by the French apothecary, Pierre Seignette in 1672, and the composition of which was kept secret for almost sixty years, until at last in 1731, two French pharmacists made an analysis.

Sodium Bicarbonate was introduced into medicine by the Berlin apothecary, A. W. Bullrich, as his "Universal Salz" in 1840. Let me point out that Bullrich "threw the bull" for a number of years and at the same time succeeded in getting "rich" from it. Nevertheless, pharmacy and medicine owe a great debt to Bullrich for introducing this chemical into therapy.

Many of the secret remedies became celebrated panaceas and obtained such fame, and did such an amount of good that the formulas of same were bought by the monarchs in those days at a very fancy price. This is an entirely different

procedure to what the present Board of Health of our great city of New York pretends to do!

The following are some of the examples:

Louis XIV, King of France, bought the following: Helvetius' Ipecac Remedy in 1686 at 1000 Louis d'or; Glauber's Kermes Mineral in 1720 at a fancy price; Talbor's Cinchona Remedy in 1780 at 2000 Guineas.

Louis XV bought the formula for La Mothe Tincture, giving him a pension of 4000 Livres a year.

Louis XVI purchased Mme. Nouffer's Tapeworm Remedy, at 18,000 Livres;

King Charles II of England bought Dr. Goddard's Drops for 6000 pounds Sterling, and Empress Catharine II of Russia invested in Bestuscheff's Tincture, 3000 Rubles.

It will no doubt interest the readers of the Journal A. Ph. A. to learn of a striking example of the effects, the bad effects, of the publication of a formula. The specific is that of *Warburg's Tincture.*

Originated in 1840 by Dr. Carl Warburg, an Austrian physician, it soon proved to be a specific in Malaria and Ague. In spite of being a secret remedy, the Austrian Imperial Health Board in 1848 ordered this tincture to be kept in stock in *all* the pharmacies of the Empire, and even established at Vienna, a central depot at which the preparation was manufactured under the supervision of the inventor.

The fame of Warburg's Tincture spread as far as India, and it was considered as one of the necessities of all British soldiers going to that country. In consequence of this, the preparation obtained a tremendous sale. At last Dr. Warburg was persuaded, in fact pressed to disclose his secret formula. Warburg did so. What was the consequence? Warburg, the originator of the celebrated Anti-periodic Tincture, died in poverty.

The author does not claim that this subject is exhausted and hopes to be able in the near future to find the time to make a complete compilation of the origin, the history and the evolution of the U. S. P. and N. F. preparations.

THE RELATION BETWEEN MEDICINE AND PHARMACY.*

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In the first place, I shall take it that we are met here to-night, physicians and pharmacists, not merely for self glorification, but for the purpose of seriously discussing the true existing relations between our two professions, Medicine and Pharmacy; to find out whether we are drifting apart, developing a closer union, or merely maintaining a *statu quo* which we have inherited from our immediate

* Read at a joint meeting of the Therapeutical and Pharmaceutical Societies of Washington, D. C., June, 1914.

predecessors. In any event we would like to know exactly what is the trend of affairs concerning our relations, the principal factors upon which this relation depends and, of course, we would like to find a way to improve these relations whatever they may be.

Primarily, I may say, what is no doubt evident to any one who thinks about it, that such a social re-union as this one to-night cannot but be productive of good results, because social intercourse between different, nay even differing interests, is the surest method of enhancing their mutual adjustment. We are, of course, not arbitrating anything, for it has not appeared that we have any differences to adjust; but the mere getting together of men engaged in related pursuits, is a sure way of enlarging their sympathies, and of widening their field of vision. What was before of only academic interest in the mind becomes vitalized by humanitarian and sentimental forces. We see not only a related science with all its technical accoutrements, but a brother human being working away and devoting his life to it. So, I would suggest, on this account, that such meetings as this be made more frequent and more general. The state pharmaceutical and medical societies should work out a plan of closer affiliation. When the American Medical Association meets annually in a certain place, there also and at the same time should the American Pharmaceutical Association meet. Could this be done some very interesting events would take place, science would be advanced, disputes would be adjusted, professional ethics enlarged, quackery and charlatanism would receive blows from the effects of which they would sooner succumb. There is, however, one thing which serves at least periodically to bring physicians and pharmacists in this country closer together, and that is, the Pharmacopœia. The decennial revision of this great book, which has gone through eight editions, with a ninth one soon to appear, provides the only formal opportunity, at present indulged in, for closer affiliation and interchange of views between the two professions. The Committee on Revision, composed as it is of distinguished representatives from both, whose work extends over a period of years, tends to enlarge, to dignify, and to perpetuate, the bond of sympathy which exists between them.

It is always best to be methodical and if I were submitting any formal thesis upon the relations of Medicine to Pharmacy I should like to begin with a review of the historical aspects of this relation.

The pharmacopœia forms the closest link between Medicine and Pharmacy. The scientific state of both at any given period, since the middle of the 16th century when the first pharmacopœia, that of Valerius Cordus, appeared (1540), may be read in its pages, and is reflected by its contents. The first London Pharmacopœia appeared in 1618. It contained 1960 remedies, of which there were 1028 simples, 91 animal products and 271 vegetable products. There were some very strange substances in it, many of which to us now appear vile and disgusting, and it is hard for us to believe that intelligent men ever attributed therapeutic value to these things, such for example as worms, dried viper lozenges, dried fox's lung, powdered precious stones, oils of ants and wolves. The edition of 1650 contained moss from the skull of a victim of violent death, crab's eyes, animal feces, cock's comb, human perspiration, saliva of a fasting man, human placenta, wormian bones from executed criminals, and other items too numerous

to mention, and, certainly revolting, when one considers the proposition of swallowing them.

But even our present Pharmacopœia contains many useless, if not so disgusting, things, and if William Heberden, in 1745, was forced to make an onslaught upon the superstitions which retained animal feces and human placenta in the pharmacopœia in his day, and did not find it an easy proposition to secure their elimination, so also, at the present time, it is no easy matter to secure the deletion of many utterly worthless substances from the modern book. I often wonder whether future generations will not look down upon our far-famed ninth revision quite as ludicrously in some respects as we look back upon the English pharmacopœias of 1650. It is unfortunate, it seems to me, that the pharmaceutical factions who are concerned in revising our Codex, are usually opposed to the idea of deletion and use their influence toward the retention of substances in the book which to the modern physician who is acquainted with the progress of pharmacological and experimental therapeutic research seem entirely superfluous, and scientifically degrading. Those who are interested in this aspect of things we are discussing should read a paper by Doctor O. T. Osborne on "The Absurdities and the Commercialism of the Proposed 9th Decennial Revision of the U. S. Pharmacopœia." Though he does not say so categorically, yet by implication, the blame is put largely upon the Pharmaceutical representation in the executive committee on revision, eleven out of the sixteen of which are pharmacists. Out of one hundred and fifty-eight drugs and preparations, proposed to be deleted from the 9th revision by the sub-committee on scope, seventy-nine were voted back by the pharmaceutical influences prevailing in the executive committee.

One of the great functions of the pharmacopœia is to keep constantly in view the close relations between Medicine and Pharmacy, which without it might by some be totally forgotten or ignored.

I had not intended to say so much about history and the pharmacopœia, but there is one more historical reference which will serve to clarify in a way, the reasons for the existence of a special feud between Medicine and Pharmacy which has been going on for about four hundred years. This is the dispute over the so-called "prescribing by druggists." According to history, the grocers were the original drug merchants in England. In 1606, during the reign of James I, the apothecaries were incorporated, and succeeded in obtaining from the grocers this coveted monopoly. This aroused the ire of physicians, because, no sooner were the druggists invested with the power to compound and to sell all medicines, than they discovered that money could be made in easy fashion by selling direct to the people on their own responsibility. Thus began "drug dispensing" and with it a war which has continued, more or less openly, to the present day. Physicians and druggists continued to wrangle on this point in England for half a century, when, in 1665, the Great Plague broke out in London. The apothecaries stayed at their posts, while the doctors, including the great Sydenham himself, fled for their lives.

It seems that even at that time, however, the druggists were much criticized for their extortion, and the huge prices they charged for much worthless stuff may have been the origin of the erroneous idea, still prevailing among the laity,

that the druggist makes anywhere from 500 to 1000% on his wares. On certain drug bills of the above-mentioned period in England, are listed 4s. for a glass of wine of iron, 3s. 6d. for a "purge for his worship," 3s. for a son's purge, 4s. for a fumigating powder. It is known that as much as 30s. was paid for one pill, and 6£ for a pill and a decoction. The pharmacists made more out of their cases than the physicians. But as a matter of fact we all know that extortion is not a monopoly of druggists and that some doctors have been known to indulge in a little of it, by way of exercise and showing what they can do.

There is no doubt that Pharmacy is receiving less and less attention in the medical curriculum at the present time. Does this mean that pharmacy is being gradually considered less and less important, to the educated medical man, or does it mean rather that pharmacy is developing so fast that it can no longer be properly covered, even synoptically, in a medical course? In this connection, we may profitably repeat what Cushny has written in his classical work on Pharmacology. He says "another subject which now occupies a much less prominent position in medical study than formerly is Pharmacy, or the art of preparing drugs for therapeutic use. Some general knowledge of the methods used, is no doubt indispensable to the educated physician, but the details may be left to the pharmacist. Pharmacy will probably occupy a still more subordinate position in medical education, as the tendency to include only one or two drugs in a prescription becomes more wide-spread. As long as a dozen or more components went to make one mixture, it was of importance to know their solubility and their interaction, but with the decay of the complex prescription the study of pharmacy by medical students has certainly become less imperative."

This appears to be a true representation of the facts, and it may have the effect of separating the physician and the pharmacist more and more, if some counter-acting influences are not called into play. It seems to me that all Colleges of Pharmacy should be closely affiliated with medical schools, just as the Dental school is closely associated. Dentistry bears the same relation to surgery that pharmacy does to medicine, and therefore the latter two should never be allowed to drift apart. The medical student is not expected to learn any dentistry, and according to Cushny and most modern pharmacologists, he should not be required to learn much pharmacy, but in order that all these cognate and corelated branches in our great medical science and art may thrive best, individually and collectively, and that the members of these sister professions may have a more adequate knowledge of their interdependence and corelation, they should all be taught in our universities as far as possible under the medical college roof. Here the great ideals which form the moral and ethical foundation of medicine can be inculcated, in the minds of all who are engaged in it, or any of its branches. Every hospital should have its expert pharmacist. Questions are continually arising which only a skilled chemist pharmacist can decide. I saw a good example of this fact in reading an article in a French journal recently by Crouzon on the use of ethero-camphorated oil. It seems that on the continent of Europe the old camphorated oil is much used, by hypodermic injection, in the treatment of senile pneumonia, collapse adynamia from diverse causes, shock, peritonitis, etc. Large doses are employed, 20 to 50cc. more or less frequently repeated. These doses produce ugly lumps in the muscular tissues and even ab-

cesses occur. Cruzon desired to know whether these disadvantages were inevitably inherent in the treatment itself, or whether they could be obviated by altering in some way the solution of the oil. This question he put to Viron, the expert pharmacist-chemist of the Saltpetriere Hospital, where both of them had worked. Viron suggested an ethero-oily solvent for the camphor in the following formula:

Camphor	1 gm.
Anesthetic Ether	1 cc.
Alcohol-washed sterilized olive oil	10 cc.

This solution, which must be prepared in a special way to prevent evaporation of ether, was found to be an agreeable substitute for the old solution and no lumps were formed. This, of course, is only a trivial example, but it illustrates the fact that there are certain problems in hospital work which can only be solved by the pharmacist, who is in this respect the true co-worker of the physician.

On the continent of Europe the colleges of pharmacy are regarded, and properly so, as integral parts of the University, and kept in closer affiliation with the medical schools than is attempted in the United States. There is no lack in number of pharmacy schools in this country, however. Although in 1840 there were only three, now there are about fifty. The student of pharmacy is often a college-bred man and the standard of pharmaceutical education is being gradually raised as in the medical schools.

It should be kept continually in mind, that pharmacy is a branch of medicine, a true specialty, and its teaching should always be conducted in colleges closely affiliated with medical schools. It will be seen thus, that our contention is, that the relation between Medicine and Pharmacy is very close and must remain so. The science of medicine is founded upon anatomy, physiology and chemistry, while pharmacy is founded upon chemistry and physics. Progress in both depends, therefore, entirely upon progression in these fundamental sciences. Of course, from the standpoint of commercialism, there will be some disputes and antagonism between Medicine and Pharmacy, but from the standpoint of true science there can be but the closest union.

It is to be hoped that the standards of education in pharmacy will continue to be raised higher and higher commensurate with the developments in chemistry, pharmacy and medicine.

If this is done the pharmacist will become a still more indispensable associate of the physician especially in the direction of analytical and pharmaceutical chemistry and perhaps also pharmacology. Such meetings as the one we are holding to-night will do good, affording as they do an opportunity of emphasizing what we should not allow to be forgotten, the close relation between the sciences of medicine and pharmacy.

WHAT INSTRUCTION OUGHT MEDICAL COLLEGES TO GIVE IN PHARMACOLOGY AND THERAPEUTICS?

B. THE VIEWPOINT OF THE PHARMACIST.*

DR. BERNARD FANTUS, PROFESSOR OF PHARMACOLOGY AND THERAPEUTICS, COLLEGE OF MEDICINE, UNIVERSITY OF ILLINOIS, CHICAGO.

The honor having been conferred upon me to participate in this symposium by presenting the viewpoint of the pharmacist, I proceeded to obtain this information by sending out *questionnaires* to leading pharmacists all over this country, with the request that these blanks be distributed among pharmacists known to be competent to make the desired examination of one hundred prescriptions each. In this manner, I believe, we have obtained reliable information from a considerable number of high-grade pharmacists representing the various sections of this country and all varieties of prescription practice. As might have been foreseen, I obtained quite a variety of reports, which, however, when averaged up in groups of ten, gave strikingly similar results.

Before presenting the report, it might be well to ask ourselves the question, What does the pharmacist know about the kind of instruction that ought to be given in pharmacology? The pharmacist merely sees one of the results of our instruction, and, I am willing to admit, not the most important one; for, of course, prescription writing is not the end and aim of our course. Still, I believe it will be granted that prescription-writing is a good index of the thoroughness of the training given, since it not merely requires an acquaintance with the rules for writing a prescription, as well as with pharmacodynamics and with therapeutics, but also a knowledge of pharmacy and of chemistry. Prescription-writing is the keystone to the whole pharmacotherapeutic arch. It is because prescription-writing presupposes a sound knowledge in these various directions, that medical students, in general, consider it a difficult accomplishment; and, I am afraid, there are even some instructors in pharmacology, who feel themselves on thin ice when confronted with the necessity of writing prescriptions or of criticizing those written by their students. No one who is not thoroughly grounded in pharmacology and in materia medica can feel himself at home in prescription-writing. On the other hand, of course, the best pharmacist is incompetent to prescribe for any case of illness because he lacks the necessary knowledge of pathology, of pharmacodynamics, and of therapeutics. However, I believe it will be admitted that a good pharmacist is competent to express an opinion upon the thoroughness with which pharmacy and materia medica are taught in our medical schools. It was with this idea in mind that I sent out, from the pharmacologic department of the University of Illinois, a question-blank, which is given herewith, together with the average percentages yielded by an examination of 10,000 prescriptions by about 100 pharmacists in various sections of this country.

* Presented at the Second Annual Session of the Federation of State Medical Boards of the United States.

REPORT ON THE EXAMINATION OF 10,000 CONSECUTIVE PRESCRIPTIONS.

a. Written in English.....36
b. Use of poor Latin.....18
c. Almost illegible.....4
d. Use of metric system.....a small percentage
e. Number of ingredients
   1. Less than three.....46
   2. More than five.....11
f. Proprietaries.....24
g. Specified preparations.....11
h. Incompatibilities.....2
i. Over-doses and errors.....1
j. Has the quality of prescription-writing improved or deteriorated within the last ten years?.....Improvement reported by 55 *per cent.*.
   In what respects?.....More U. S. P. and N. F. preparations used. Deterioration reported by 20 *per cent*.....
k. Other remarks....."Doctors have an insufficient knowledge of pharmacy and prescription-writing" reported by quite a number.....

The first point shown by this investigation is that over one-third of all prescriptions are written in English; and that almost one-fifth are written in poor Latin. In view of the fact that, no doubt, all medical students are taught to write prescriptions in Latin, it is evidently a rather poor result that less than one-half of the prescriptions written are in correct form. We note from the report that four *per cent.* of the prescriptions are "almost illegible." Of course, there is no excuse for any of them being written so poorly; but, in view of the popular idea regarding the bad chirography of physicians in prescription-writing, and the jokes levelled at the medical profession on account of this, the showing seems to me remarkably good. I am wondering, however, whether four *per cent.* of the checks on banks, written by physicians, would be reported upon as almost illegible.

The metric system is not yet used to any extent in this country. This is unfortunate. The existence of the two systems of weights and measures side by side is surely an abomination. The use of one or the other must be discontinued; and the sooner this is done the better. Now which one shall it be? Science says the metric system is the only one fit to survive; it is chiefly the force of inertia that maintains the other. The medical students in the majority of our schools are embarrassed by being taught prescription-writing in the metric system in their courses in pharmacology, and by finding their clinical teachers in the practice of medicine and in the specialties still using the old system. Would it not be possible for our revered old medical teachers to adopt the new system, even at the expense of some exertion and vexation on their part, in order to spare the host of those entering the profession the difficulty and annoyance of learning both systems, and possibly mastering neither? I believe resolutions are in order among all the faculties of our medical schools, that henceforth only one system of weights and measures shall be used by all the members of the faculty and that this system shall be the metric system. I am wondering whether this great and powerful national body could do something to save our students the necessity of learning the use of two systems of weights and measures.

Poly-pharmacy is defined as the prescribing of too many medicines, especially

in one prescription. Surely more than five is too many. Our report shows that poly-pharmacy is still practiced to the extent of eleven *per cent.* On the other hand, we ought to congratulate ourselves upon the fact that almost one-half of all prescriptions written are comparatively simple in composition, containing less than three ingredients.

We now come to perhaps the most significant portion of the report, namely, the extent to which proprietary medicines are prescribed. While I am not narrow enough to believe that proprietary medicines should never be prescribed, surely twenty-four *per cent,* the figure shown in the report, is too high to represent a desirable condition. It is somewhat of a disappointment after all that has been said and written against the use of proprietary medicines, to discover that one prescription out of every four still calls for proprietaries. I find that pharmacists, in general, base their reply to the question whether prescription writing has improved or deteriorated, upon their experience in the use of proprietaries. Bearing in mind that most of these reports come from pharmacists, who have been prominent in the so-called "U. S. P. and N. F. Propaganda," and who, probably, have concentrated their propaganda upon the physicians whose prescriptions they receive, the figure in the report is probably too low to represent the condition existing in general. Proprietary medicines, I take it, owe their existence to a combination of factors, none of which is of credit to either medicine or pharmacy. No one will dispute the conclusion that, if pharmacology, using the term in the widest sense, were properly taught, the use of proprietary medicines would reach a very much lower percentage. It is unfortunate, by the way, that no better agreement exists on the meaning of the term pharmacology. The proper definition is the one accepted by the Chairman of this meeting, namely, that it includes the study of *all* that is known about drugs; and not merely the study of the action of drugs upon living forms, as it is defined by some. For this portion of pharmacology the term pharmacodynamics should be used. It is instruction in pharmacology in the narrow sense, instead of in the wider sense, that is responsible for the helplessness on the part of the graduates of some of our best schools, when it comes to prescription-writing.

The use of specified preparations denotes a lack of confidence in the pharmacist on the part of the prescribing physician. I am glad to note that it does not exceed eleven *per cent.*

That incompatibilities do not exceed two *per cent.* is perhaps somewhat gratifying. Though over-doses and errors do not exceed one *per cent.,* that number even is too great, considering the seriousness of the possible issue. It shows the advantage of the services of the pharmacist in safeguarding us and our patients against errors.

On the question whether prescription-writing has improved or deteriorated, my correspondents are divided. About fifty-five *per cent.* report improvement, mostly in respect to the prescribing of fewer proprietary medicines. Twenty *per cent.* report deterioration, and the balance of my correspondents do not commit themselves on this point. Quite a number, however, note, under "other remarks" that doctors have an insufficient knowledge of pharmacy and prescription writing. That this is quite a general opinion on the part of pharmacists may be judged from several papers that have been written on this subject within the

last year. I may mention R. H. Needham's paper on "Do Physicians Understand the Fundamentals of Prescription Writing?" presented before the Nashville meeting of the American Pharmaceutical Association in 1913, in which he arrived at a negative conclusion. I would also like to call your attention to a paper by L. E. Sayre, on "Materia Medica in Medical Colleges," published February, 1914, in the *Journal of the American Pharmaceutical Association,* in which he points out that this teaching is deficient.

After all, however, pharmacists do not see our worst failures in the teaching of prescription-writing. I am convinced that a certain proportion of our graduates, on entering practice and finding themselves incompetent to write prescriptions, solve their problem by not writing prescriptions at all, dispensing their own remedies, with all the evil results of such practice.

Summing up our findings, it becomes evident that there is need for considerable improvement in prescription-writing. This could be secured if it were realized that prescription-writing cannot be taught by lecturing or by demonstrations; that the students must be drilled in prescribing. I believe that the best results can be obtained, if a course on pharmacy and prescription-writing be given before the work in pharmacology is taken up. The students should be made familiar, in this course, with the various classes of pharmaceutic preparations and their prescribing. Then, when the student enters his course in pharmacology he is ready to write prescriptions from the very beginning; and he ought to be required to write prescriptions for each of the important drugs as they are studied, paying special attention to methods of pleasant and efficient administration. When the student finally advances to the study of therapeutics he should be required to write prescriptions from the standpoint of the effect. Finally, if the clinical instructors would do their duty and require the students to write prescriptions for the remedies needed by the patients treated in the hospital and in the dispensary, our students would leave our medical colleges well trained in prescribing.

There are two ways in which state medical examining boards could bring about improvement in prescription-writing. First, by restricting their examinations to the "List of Useful Drugs," published by the American Medical Association, or, if this list does not suit them, to any other list they may choose, and by publishing this list so that teachers in this branch may be able to concentrate their students' energies upon the really useful and important drugs. With the limited time at our command, we can only do one of two things, either give our students a superficial and therefore useless knowledge of a large number of drugs, or, a thorough acquaintance with a relatively small number. Surely the latter would be much the more profitable course; this we would pursue, if the state boards would help us by giving us a list of drugs to which they would confine the examinations. Secondly, by requiring candidates to write actual prescriptions in the examinations. This would serve as a wonderful stimulus to teachers and students alike to perfect themselves in the art.

THE MONASTIC DISPENSARIES OF THE MIDDLE AGES.

LEO R. A. SUPPAN, M. D.

According to ancient tradition the systematic practice of medicine and pharmacy reached a high stage of development in Egypt, whence it passed to Greece and from there to Rome. With the extinction of the old Roman empire in the sixth century, came a subversion of the ancient social order in which the physicians shared. The medical practitioners representing the Graeco-Roman school became extinct. But many of their teachings continued to linger among the lower classes, to be ultimately transformed into an unreasoning and grotesque folk-medicine, while the real medical science, such as it was, became the heritage, in Western Europe, of the Monks, who, for nearly four centuries exercised it as their exclusive monopoly.

It was the Benedictines, particularly, who kept alive in the earlier centuries of the middle ages the body of medical and pharmaceutical studies and practice. When St. Benedict of Nursia established his monastery at Monte Cassino in 529, one of his rules was that the monks should devote such time as was not taken up by their religious duties to the collection, study and copying of ancient manuscripts. There is still in existence a letter from the learned Cassiodorus, statesman, writer and monk of the sixth century, addressed to his brethren, in which he recommends them to study diligently the works of Hippocrates, Galen, Dioscorides, Caelius, Arelianus and other Greek and Roman writers on medicine and materia medica; and he exhorts them to become acquainted with all useful plants, to familiarize themselves with the compounding of drugs and to inquire into everything that may be of benefit to the sick and afflicted who take refuge in the monasteries. Naturally, all the monks were not of equal learning; there were some who understood Greek, and these made translations into Latin, compiled lexicons and wrote commentaries; Cassiodorus recommends those who are not familiar with the Greek language, to read the works written in that tongue in translation. Those brothers who had no great aptitude for learning were employed in other useful occupations, many of them finding a place in the *scriptoria*, or writing-apartments, where they busied themselves with the copying and illumination of manuscripts, many of which have come down to us, and are, to-day, highly prized objects in the great libraries and museums of Europe. It is to the rapid and extensive multiplication of the Benedictine monasteries, subsequent to the founding of the parent house at Monte Cassino, that we owe our possession of many of the most precious works which were the fruit of Greek and Roman genius; for every monastery, large and small, was a busy work-shop, where the transcriber was at work in his quiet occupation.

The monasteries in their first inception were places to which the pious might retire from the vanities of the world and devote themselves to religious contemplation and the prescribed ceremonies of the Christian church; but they soon added another important function, that of extending hospitality to travelers, both of high and low degree. Every one had its guest house, where refuge with accompanying entertainment was furnished. No charge was made, but the guests were

expected to present some token of appreciation according to their means, upon taking leave. Rooms which were set apart for the care of sick monks also received the poor of the neighborhood, who were attended by the physicians in charge of the conventual infirmaries and dispensaries. Moreover, in the absence of medical schools outside the convent walls, the monastic physicians were called to attend exalted personages at their own residences, often many miles away, upon which professional expeditions they were usually accompanied by assistants who were pupils and who prepared the required medicines under the direct supervision of the doctors. In some cases the physician, when called to a distant patient, carried with him the remedies already prepared. An instance of this kind is related in the *Chronicon Monasterii Cassinensis,* as follows: In the eleventh century, there lived in Monte Cassino, a monk named Alfanus, who was distinguished for his scientific mind, and his attainments in the healing art. On one occasion the Abbot, Desiderius, paid a visit to the pope, and being ill, he took Alfanus with him in the capacity both of friend and medical attendant. Alfanus took with him a number of medicaments, which he had prepared beforehand, an indication that there existed in the monastery, a laboratory of some kind, in which they were made. One of the inmates of Monte Cassino, at that time, was Constantinus Africanus, whose name is indissolubly linked with the famous medical school of Salerno, the first secular institution of its kind in western Europe.

Berendes, in his work, entitled, "Das Apothekenwesen," states that Dr. Albers, the keeper of the Archives at Monte Cassino, expressed to him the opinion that Constantinus was the first to arrange the monastic dispensaries according to a definite plan.

In a monograph entitled, "Wilhelm der Selige, Abt von Hirschau" (William was elected Abbot in 1071), Kerker confirms the surmise that the early monasteries contained a pharmaceutical laboratory and dispensing department of some kind. He shows that in the Benedictine house of Hirschau, situated in the Black Forest, there existed an infirmary or hospital over which presided an *infirmarius* or *armarius,* who was always a priest, and who had at his disposal as many assistants as he required to discharge his duties properly. In the infirmary the sick were bedded on rush mats, kept scrupulously clean. In the middle of the monastery was a covered space with an opening in the center, where blood letting was performed and the sick had their diseased limbs washed and anointed. It was also used as a sort of laboratory for preparing medicines. Every day the *infirmarius* made requisition for the various articles which he required for the sick in his care. But he kept on hand in his *armarium,* which we may translate "medicine chest," certain herbs, spices and other drugs;—cinnamon, pepper and ginger are specifically named,—which were to be held ready for cases of emergency. Another of his duties was to make the nightly round of the hospital and to see that the drinking-cups of the patients were filled, so that they should not suffer thirst. It is evident from this account that the office of chief infirmarian was an important one, and combined the functions of head physician and head pharmacist.

The title *apotecarius* (apothecary) appears to have been used at a very early date as equivalent to *armarius,* i. e., Keeper of the medicine chest. In his work, "La Pharmacie en Poitou," M. Pierre Rambaud, states that he found the name "apotecarius" in a number of Poiteven title deeds dating from the end of the tenth

century; at the bottom of a deed, drawn in 967, occurs the signature of a certain Salomon, a monk, who appends to his name the word "apotecarius." In 976, the signature of the same Salomon is again found, and this time he calls himself *subdecanus*, or vice dean. In a document of the year 985 occurs the signature of a "Rotbertus, apotecarius," which follows immediately after that of the Count of Poitou, the Abbot, the treasurer and the dean, and precedes thirty other signatures. M. Rambaud cites other cases, all showing that these physician-pharmacists held high stations in the monastic houses, and were men of learning and great administrative ability.

As there were no lay medical schools in the early times of which we are writing, the medical education of the monks who intended to devote themselves to the practice of it, must have been imparted within the monasteries themselves. It was undoubtedly wholly of an empirical nature. The pupil, one may suppose, accompanied his master to the bedside of the patient where he listened to a description of the symptoms and heard the diagnosis, all of which he committed to his tablets for later study; he probably also assisted in the preparation and application of bandages and, under the watchful eye of the master, compounded the necessary medicines. In this way he became acquainted with therapeutics and stored his memory with a vast number of recipes. But he also acquired an excellent first-hand knowledge of the character, properties, uses, and perhaps, cultivation of a number of medicinal drugs, for the monasteries possessed, as we shall see later, medicinal gardens, in which the plants which furnished the bulk of the medicines used in the infirmaries were cultivated. The pupil gained his theoretical knowledge from the works of the Greek and Roman physicians, which he was required to read diligently and, unquestionably, he had to learn by heart the prayer which invariably accompanied the administration of a medicine. Pathology, of course, was a non-existent science in those times.

Every monastery possessed its own formulary or collection of recipes for medicaments of various sorts, and it is astonishing how vast a number of these have come down to later ages. They were copied more or less literally from the ancient writers and were accompanied by prayers, or rubrics where prayers were to be said, while the medicine was supposed to be taking effect. I conjecture, that many of these recipes were embodied in the popular "household medicine books," which were so popular in the seventeenth and eighteenth centuries, and some of which survive at the present day in out-of-the-way corners of Europe.

Toward the end of the twelfth century the monastic medical schools began to lose considerable of their importance, in consequence of the establishment of the medical faculties in the great universities of Paris and Montpellier, to which students streamed from all over Europe. The faculty in medicine at Paris, was probably established before 1160, and at Montpellier instruction in medicine was begun in 1181.

A curious document has come down to us from the ninth century which gives an idea of the arrangement of the medical department in the mediæval monasteries, and which may be fittingly described here.

In the northeastern part of Switzerland there lies only a few miles from the Lake of Constance, the town of St. Gallen, or St. Gall, the chief town of the canton of the same name. It is a thriving place with some forty thousand in-

habitants, and is important for its textile industry. The tourist who is possessed of an historical imagination, and who visits Switzerland more with the purpose of evoking the romantic past, rather than to study modern social and commercial conditions, finds it worth while to stop here for a few days and examine what remains of the old abbey, a monastery founded in 720 by St. Othmar, on the rules laid down by St. Benedict.

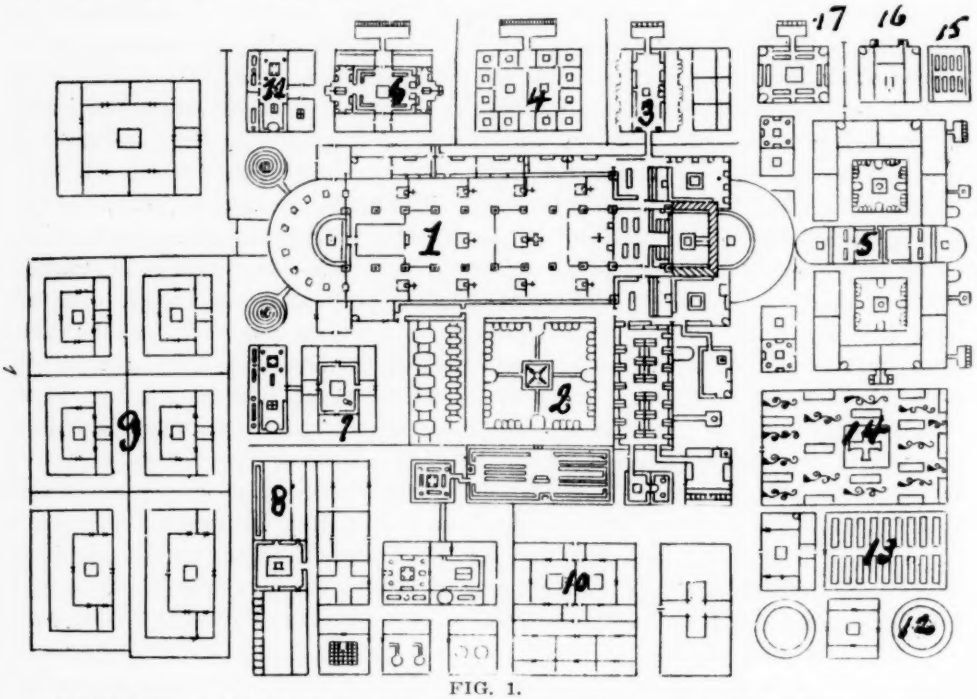


FIG. 1.

General plan of the Monastery of St. Gall in Switzerland, from a copy drawn from the original and published in Brockhaus' Bieder-Atlas.

1. The Monastery church.
2. Cloisters for the monks.
3. Abbot's residence.
4. School for children of the laity.
5. Chapel for the novices.
6. House for the reception of guests of the higher classes.
7. House for the reception of poor pilgrims.
8. Buildings where corn was ground and provisions stored.
9. Stables for domestic animals and living apartments of lay servants.
10. Living apartments for laborers of various kinds.
11. Monastic kitchen, bakery, and brewery.
12. Poultry yard.
13. Kitchen garden.
15. Medicinal garden.
16. Dispensary and pharmaceutical laboratory.
17. Bleeding-house.

In the year 613, or thereabout, a pious recluse named Gallus or St. Gall, a follower of St. Columba, left Ireland on the destruction of the famous Irish abbey of Bangor by the Danes, and established his hermit's cell in a dense forest, which reached from the Lake of Constance to the Santis Mountains. Here he devoted himself to missionary work for the conversion of the half barbarous tribe of the Alemanni, in which he was so successful, that in the course of but a few years, huts and other little buildings sprang up on the site of his labors. These rude settlements formed the nucleus of the great monastery and the town bearing the Saint's name, which grew up and flourished under its walls. The abbey became

very wealthy through the gifts of pious well-wishers and, down to the end of the eleventh century, was the site where literature and the sciences, such as they were in the middle ages, were assiduously cultivated and flourished under the liberal patronage of learned abbots and other benefactors of the convent.

To the student of pharmaceutical and medical history, the abbey of St. Gall is of particular interest, from the circumstance that in the year 830 the abbot Gozbert conceived the idea of reconstructing the monastery buildings and entrusted the devising of a suitable plan to Eginhard, it is said, the architect of Charles the Great. This plan not only gives us a clear idea of the arrangement of monastic settlements as they were deemed suitable in the earlier period of the middle ages, but it also shows us the provisions made for the care of the sick, and the source

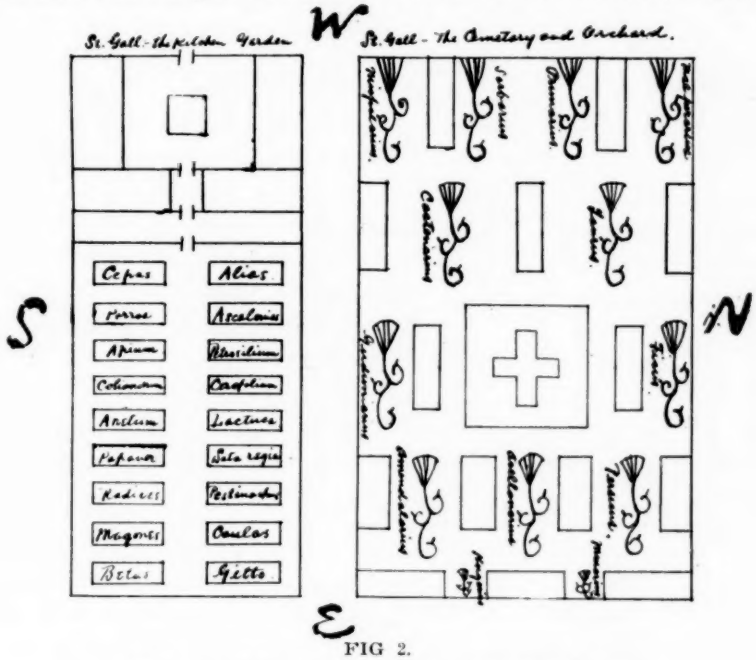


FIG 2.

The kitchen garden and cemetery at St. Gall, after a sketch by J. Berendes, published in the Pharmazeutische Post. The kitchen garden is to the left in the plan and the cemetery with orchard to the right. The meaning of the terms used in this plan is explained in the text.

and preparation of medicines for the relief of their affliction. There is some doubt as to whether the abbey was really reconstructed according to this plan, for, in the Napoleonic era, the foundation became much enlarged and many of the buildings then existing were modified, some being turned over to the government for the accommodation of public offices and others transformed into dwelling houses. The original plan is still in existence and consists of a sheet of parchment, sewed together of four skins, the whole about three and one-half feet long and two and one-half feet wide, the lines being drawn in red ink. It was published in *fac-simile* by Ferdinand Keller at Zürich in 1844, with explanatory notes, and by Professor Willis, in England in 1848.

The plan shows a complex of buildings about four hundred and thirty feet in

length and three hundred feet in width, the center of which was formed by the great conventual church, two hundred feet long, together with its cloisters, refectory and other buildings designed for the monks alone. About this nucleus were grouped the abbot's residence; the guest houses for the reception of strangers—those for visitors of high and low degree being separated—the school for the children of the laity, the school for those who intended to become members of the order, (*oblati,*) the kitchen, bakery, brewery, the workhouses where corn was ground and fruits were dried, a kitchen garden, an orchard, a garden for the growing of medicinal plants, an infirmary, stables and stalls for domestic animals, sleeping places for servants and laborers of various kinds, and other structures necessary to the domestic economy of the monastery. In short, it represents a

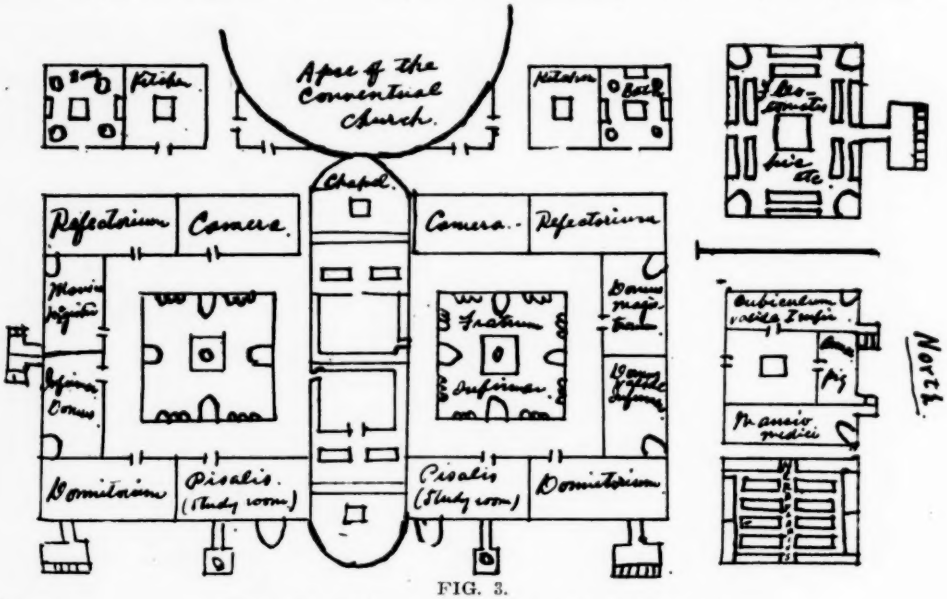


FIG. 3.

Plan of buildings to the north of the orchard. The arc of circle at the top is the apse of the monastery church represented in figure 1. Adjacent to this is the double chapel (the long oblong with rounded ends), one-half of which was the place of worship for the novices, and one-half for the inhabitants of the infirmary. The inscriptions are explained in the text. To the right are the medicinal garden (lower right hand corner), the dispensary and, beyond a wall, the bleeding house.

city *in petto,* all in accord with the rule of St. Benedict that the conventual settlement should itself produce everything for its needs, in order that it might be as nearly independent of the outer world as possible. The general plan is shown in figure 1.

What interests the pharmacist particularly in this plan is the group of buildings and gardens to the east of the apse of the conventual church. In the south-east corner are two enclosures of a circular form for poultry, between which lies the poultry keeper's house, represented in the general plan by a rectangle nearly a square. To the north of this is the kitchen garden with the gardener's house at the west end of it. This enclosure is represented in figure 2, together with the cemetery-orchard.

The identity of the plants indicated in the plan of the kitchen-garden are in some instances open to conjecture. A. Tschirch, in his *Handbuch der Pharmacognosie* gives the following modern equivalents for them:

Cepas—Allium cepa.
Porros—Allium porrum.
Apium—Apium graveolens.
Coliandrum—Coriandrum sativum.
Anetum—Anethum graveolens.
Papaver—Papaver somniferum.
Radices—Raphanus sativus.
Magones—Daucus carota.
Betas—Beta vulgaris.
Alias—Allium sativum.
Ascalonias—Allium ascolonicum.
Petrosilium—Petrosilinum sativum.
Cerefolium—Scandix cerefolium.
Lactuca—Lactuca sativa.
Lata regia—Satureia hortensis.
Pestinachus—Pastinaca sativa.
Caulas—Brassica oleracea.
Gitto—Nigela sativa.

To the north of the kitchen-garden, the right of the plan in figure 2, is an enclosure which served both as a cemetery and orchard. In the middle is a huge cross upon which the architect designed the following inscription to be placed:

Inter ligna soli haec sanctissima crux est,
In qua perpetuae poma salutis olent.

(Among the trees of the earth the cross, on which the fruits of perpetual salvation shed their perfume, is the most sacred.)

Hanc circum jaceant defuncta cadavera fratrum
Qui radiante iterum regna poli accipiant.

(Around this [i. e., this cross] shall lie the bodies of the brothers, by whose glory they will gain the realm of heaven.)

The arabesques in this plan represent thirteen species of nut and fruit trees. The names of these with their equivalents are:

Mal perarius—pear tree.
Prunarius—plum.
Sorbarius—checkerberry tree (*sorbus domestica.*)
Mispolarius—medlar.
Laurus—laurel.
Castenarius—chestnut.
Ficus—fig.
Guduniarius—quince.
Persicus—peach.
Avellanarius—hazel nut.
Amendalarius—almond.
Murarius—mulberry.
Nugarius—walnut.

It is probable that the planting of these trees in the cemetery served a two-fold purpose:—they were decorative and at the same time useful.

North of the cemetery is a group of buildings arranged in quadrangular form about a double chapel. The southern half of this group contained a school for the education of the novices, that is, those who were preparing themselves for the monastic life, and a part of the chapel is also set aside for them. The plan (Fig 3) shows the dormitories, refectories, study rooms, (*pisalis*), and bath-house and kitchen.

On the other side of the chapel is a quadrangle inside of which is a large square building marked *Fratrum infirmarium*, or infirmary for the monks. (The infirmary, it may be remarked *en passant*, was not only a hospital in the modern sense of the word, but also served as a refuge for monks whose age or other infirmities incapacitated them from taking part in the devotional exercises and other occupations of the monastery.) In the block around the infirmary are a refectory, a living room, study room, dormitory (*domus magistrorum*) and a chamber marked *Domus Valide Infirmomum*, or house of those dangerously ill.

But the row of rectangles to the north of the large block of buildings just described is what interests us most. (Numbers 15, 16 and 17 in figure 1.) There are three of them, two being grouped together in the extreme north-east corner

and separated from the third by a partition, probably a stone wall. (The plan of these is shown in detail in figure 4.) The one standing by itself, bears the inscription, "Fleotomatis hic gustandum et potionariis." The word "Fleotomatis" has been conjectured by Berendes and others to be a misspelling of "Phlebotomatis," and the inscription would mean that this building was designed for the use of the phlebotomists (blood-letters) and the servers of purgative drinks. Bleeding was universally practiced as a panacea for innumerable ills during the Middle Ages, and the operation was followed by the administration of a purgative, invariably in the form of a decoction or infusion. It was the custom to bleed monks at certain intervals for the benefit of their health, as a hygienic measure. Mr. A. H. Thompson, in his interesting monograph on "English Monasteries," says in reference to this practice in mediæval England: "Each of the Augustinian canons of Barnwell was allowed to be bled once every seven weeks, if he so desired; he might even be bled once a month if his health demanded it, but in this latter case

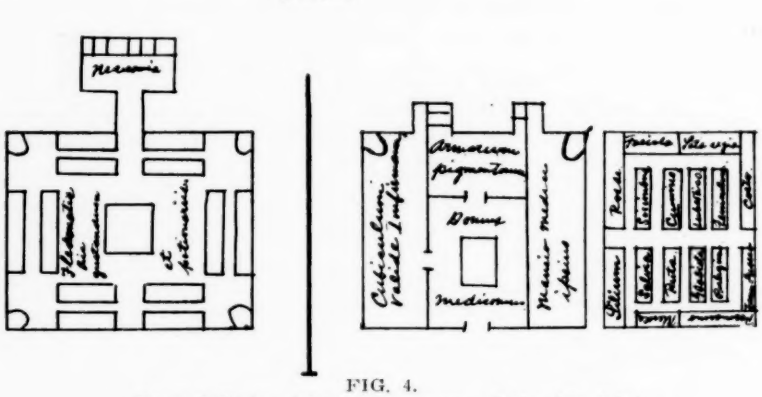


FIG. 4.

From left to right: The house of the blood-letters; the dispensary, with residence of the physicians and an apartment for patients requiring careful attention; the medicinal garden. For an explanation of the inscriptions, see the text. These plats correspond to those numbered 15, 16 and 17 in the general plan, figure 1.

was not allowed to take his furlough in the infirmary. The leave allowed at Barnwell lasted three days and canons were permitted during such periods to talk to each other and take walks within a limited area. In the Cistercian and Carthusian orders the rules were stricter; the monks were bled in batches, appointed by the friar at fixed seasons in the year,—four seasons in Cistercian, five in Carthusian monasteries."

It is natural that under these circumstances a special building should be set aside for this operation, and it was convenient to dispense the decoctions which followed the bleeding in the same apartments.

On the other side of the wall referred to is the strictly pharmaceutical department of the monastery. First comes a building, the house occupied by the physicians, divided into four apartments. Extending along one side is chamber marked "Cubiculum valide infirmorum." Berendes conjectures that the latter housed those suffering from infectious diseases, as it is separated from the general infirmary. I am inclined to the opinion that it was designed for patients whose

maladies were of such a nature as to require the immediate attention of the physician at any moment, since it is connected directly with the physicians' quarters. The room marked "Armarium pigmentorum" is the apothecary shop or dispensary. It was here that drugs were stored and compounded on the order of the chief physician by his assistants. Unfortunately we have no information as to the arrangement of this dispensary, but it is probable that according to modern ideas, the apparatus used was extremely crude, being confined to the pounding-mortar and infusion pots.

Adjacent to the Doctors' house is the medicinal garden, divided into sixteen plots. Here were grown the medicinal plants which constituted the vegetable materia medica of the monastery.

The names of the plants are indicated in the plan, and nearly all these have been identified with plants known to us. This medico-botanical garden deserves a paper for itself, and so only a brief notice can be given here, to the plants cultivated therein. The following table gives their names with the modern equivalents:

Lilium—*Lilium candidum.*
Rosas—*Rosa rubiginiosa,* sweet briar.
Fasiolo—*Dolichos melanophthalmos,* says Berendes.

The commentators are at variance as to the nature of this plant. The Greeks called a certain kind of bean which was cultivated in their gardens *Phascolus.* I have not been able to find *Dolichos-Melanophthalmos* in the books at my disposal. It was probably the common kidney-bean which, according to Dioscorides, was esteemed as a diuretic in ancient times.

Sata regia—*Saturcia hortensis* summer savory.
Costo—*Tanacetum balsamita.*
Fena greca—*Foenugreek.*
Rosmarino—*Rosemary.*
Menta—Probably *Mentha Crispa, aquatica* and *piperita.*
Salvia—*Salvia officinalis,* sage.
Ruta—*Ruta graveolens,* rue.
Gladiola—*Iris florentina* and *germanica.*
Pulegium—*Mentha pulegium,* pennyroyal.
Sisimbria—*Mentha crispa.*
Cumino—*Cuminum cymicum* cummin.
Lubestico—*Levisticum,* lovage.
Feniculum—*Fennel.*

The plan of St. Gall represents an ideal Benedictine monastery as it was conceived in the mind of the architect, but it is not certain that it was ever realized in its entirety, and so the medicinal garden just described may not be the one that actually existed. But we have an interesting document of the same period in which are described the medicinal plants that grew within this monastery. This is a little book entitled, "Herbularius," or the "Little Garden," and was written by a monk named Walafrid Strabus or Strabo. Strabus was born in 806 or 807, and received his education in the monastic school at Fulda, under the learned abbot Hrabanus Maurus. He was not only keenly interested in the phenomena of nature, but also possessed considerable poetic talent, and in his fifteenth year distinguished himself by some eulogistic verses addressed to Ebbo, Bishop of Rheims. At the age of twenty-eight he entered St. Gall, where his sincere piety and distinguished talents led to his election as dean of the monastery. In 842 he became abbot of Reichenau on the Untersee. He died July 16, 849. More than twenty works are ascribed to him, all written in Latin, of which the one of the greatest importance to the antiquary is a little book entitled, "Hortulus Monasterii Sancti Gallensis, Abbati Grimaldo Inscriptus" ("The Little Garden of the Monastery of

St. Gall, dedicated to Abbot Grimaldus.") The history of this work is somewhat peculiar. It was first given an extended publicity in a poem entitled "De Viribus Herbarum," and bearing the name of Macer Floridus as author, dating from the tenth century. It then fell into utter oblivion for a time, to be rediscovered in the sixteenth century. It was published in Vienna in 1510 under the editorship of J. Watter, a professor at the University there. This edition, which is now very rare, is regarded as the best.

In 1512, Watter's edition was reprinted at Nuerenberg in a more ornate form. We are told that the type used was Gothic and that the title page was decorated with the picture of a garden,—probably an idealization based upon Strabus' description. A certain Johannes Atrocianus or Acronius, professor of mathematics at the University of Basel, gave out an edition which was published in that town in 1527. There is also a Frankfurt edition which bears no date. Of modern editions, may be mentioned that of L. Choulant, which appeared in Leipzig in 1832, and of Reuss, Wuerzburg, 1834. In 1908, Professor J. Berendes published Reuss's text, with a translation in German, in the *Pharmazeutische Post*. The "Hortulus" is a poem consisting of four hundred and forty-four hexameter lines in which are described twenty-three plants cultivated for medicinal purposes in his time. The plants are described and their uses indicated. Not only this, but instructions are given for preparing the soil, sowing the seed and setting out young plants. The descriptions show a keen observation on the part of the author, and their conciseness reminds us that of prevailing in modern pharmacopœias.

The mediæval materia medica offers an interesting subject for study. It is not always easy to trace the plants which were grown in the convent gardens for the monks often applied fanciful names to them, based upon some real or imagined connection with the events recorded in sacred history. Thus we find, "Oculus Christi" for *Myosotis Scorpioides; "Rosa Sanctae Mariae" for Paeonia officinalis; "Lancea Christi"* for *Ophioglossum vulgatum; "Radix Sancti Spiritus"* for angelica root,—many of which are still given as synonyms for popular medicinal plants in European herbals of to-day.

Certain religious orders gained renown for certain special plants to the cultivation of which they devoted much care. The Carthusian gardens at Freiburg in the Breisgau, produced angelica of a fine quality. Licorice root from the Benedictine herb garden at Wurtzburg was highly prized. At a later period, when the process of distillation had come to be understood, the manufacture of essences and cordials engaged the attention of the monks, the well-known "Benedictine" and "Chartreuse" liqueurs which are still produced in our own day furnishing noted examples. Compound medicines were also prepared and later sold to the public who prized them highly. The best known is perhaps the *Eau des Carmes* or *Eau de Melisse des Carmes,* which was first compounded in the pharmacy of the Barefoot Carmelites in Paris in 1611. This preparation became a valuable monopoly of the monks in the course of the century, for they kept its formula secret and maintained its sale by judicious advertising of a sort. Of course, the apothecaries and manufacturers of secret nostrums were anxious to secure the formula, and innumerable experiments were made to ascertain its nature. Many "just as good" recipes were published, but none of them produced a preparation with the satisfying qualities of the original. Louis the Fourteenth, Fifteenth and Sixteenth

granted patents to the Carmelites on this preparation, each for limited periods. In 1780, however, when a new application for a patent was presented, the Paris School of Pharmacy opposed it; but a compromise was effected according to which the monks were to retain their monopoly in consideration of their paying a sum of about two hundred dollars yearly to the College. When the French Revolutionary government suppressed the monasteries in 1791, and confiscated their property, forty-five Carmelites of the monastery of Vaugirard established a company to continue the manufacture of the *"Eau des Carmes"* as a private commercial enterprise. It was provided that as the forty-five partners successively died, the property should pass into the hands of those who survived. The longest to live was Brother Paradise, who became sole proprietor and died in 1831. To the last the *Eau* was prepared on the premises where the forty-five projectors had started it.

The composition of this cordial was never divulged, but the chemist Baumé worked out a formula for a preparation said to resemble it very closely, which was adopted into the *Codex*. It called for balm (*Melissa officinalis*) freshly gathered and freed from the stems, two pounds; fresh lemon peel, four ounces; coriander seed, eight ounces; nutmeg, cloves, cinnamon, all crushed, of each two ounces; angelica root, dried, one ounce; alcohol, ten pints. The cordial was employed as a stomachic and was evidently an extremely pleasant one to take.

The convent gardens existed until late in the eighteenth century, one at Munich being mentioned in 1750. This fascinating subject tempts one into a wide digression; but it is deserving of a paper to itself and must be left to a future occasion.

After a time the monastic hospitals became decadent, for rank commercialism crept in. Certain monk-physicians became famous and were called from their monasteries to attend princes and other persons of high degree. The recompense they received was generous, and they were attracted to the lives of the laity, whose tastes and habits they adopted. They neglected the poor and devoted themselves to the wealthy for the sake of rich fees. In many cases they abandoned their monasteries altogether. Their example was followed by their subordinates of the cloister who adopted a life of vagabondage, and swarmed over the country selling "cure-alls" at extravagant prices and even dabbling in the teaching of their pretended medical secrets to anybody who would pay for them—and there were many who did. Berendes relates an amusing anecdote of a monk, real or pretended, who appeared at Erfurt in 1227 and advertised himself as a specialist in diseases of the eye. His "cure" consisted in delivering a blessing upon lumps of clay, which he then kneaded into a dough and smeared over the eyelids. He was accompanied by an assistant who wrote certain verses, supposed to be wonder-working, upon slips of parchment, which he sold as a panacea at a handsome profit. This precious pair was soon unmasked as a couple of swindlers and chased out of town. The scandal became so great, that in 1131 the council of Rheims forbade the regular clergy to practice medicine. The edict was reaffirmed by the Lateran council of 1139, and that of Tours in 1163. These prohibitions were launched against the monks in order to put a stop to a habit which had become quite common on the part of some of their number, of their leaving the cloisters, whereby they disgraced their order; but it did not apply to the orders of canons and the secular priests who continued to practice medicine and pharmacy for many years after without interference.

Another circumstance, which later aided in discrediting the monastery pharmacies in the eyes of the secular authorities was the competition into which they entered with the lay apothecaries. The precise date at which these latter first appeared is a matter of uncertainty, but it was probably about the twelfth century, although at that time they must have been under the absolute control of the physicians, who were also laymen. It is certain that in 1140 Roger, King of Sicily and Naples, issued an edict, designed to check the quackery of the itinerant monks, in which it was ordered that anybody who designed to practice medicine should subject himself to a "Judgment" (*judicio*) as to his qualifications. This was probably done on the representations of the physicians. The law promulgated by the Emperor Frederick the Second in 1241 adjusted more definitely the relations between physicians and apothecaries and made the calling of the latter a distinct branch of medicine, *not*, however, as is sometimes stated, an independent profession. The doctors of medicine were prohibited from owning a shop for the dispensing of medicaments, but they had full power to exercise supervision over the shops, to inspect them at fixed times and to examine candidates as to their qualifications. These provisions eventually led to friction between doctors and apothecaries, which has been bequeathed to the respective practitioners of our own times. I need refer only to a proposal made by certain physicians within the past few years, to issue certificates to such pharmacists as might be deemed worthy of the distinction in the eyes of the physicians in question, which certificate should be equivalent to the statement that only those druggists possessing it were qualified to dispense prescriptions.

The quarrel between the apothecaries and religious houses which maintained dispensaries became acute when, soon after their founding in 1534, the Jesuits established pharmacies in their houses, at first for the free distribution of medicines to the worthy poor, in connection with their hospitals. There are many documents in existence, chiefly in the form of letters from the Superiors to the members who acted as nurses, exhorting them to keep the hospitals well supplied with the necessary medicaments, but for use within the hospitals only. These orders were not strictly obeyed, for we read that after a while medicines were furnished gratis to the poor outside the walls and indeed, to anybody that asked for them.

This became a drain upon the finances of the houses, and it was found necessary to make a nominal charge for the articles dispensed. The medicines were sold at a low cost and were moreover, of excellent quality—two circumstances which created a large demand. The regular apothecaries, of course, objected bitterly to this state of affairs, and the Superiors, recognizing the justice of their demands, issued order after order, forbidding all commercial transactions in Jesuit houses as against the spirit and letter of the law according to which religious establishments were to act. But even the authority thus exercised was of little avail, for in a fragment of a manuscript letter dating from the beginning of the eighteenth century, we find it decreed by the Superior that all simples intended for filling prescriptions for *composita*, i. e., mixtures, must be purchased from an apothecary in the town and only in the quantities prescribed by the physicians—from which we are led to infer that patients sought the advice of the lay doctors, and took their prescriptions to the monasteries to be filled. Thus a means was

found for avoiding trespass upon the privilege of the apothecaries, and at the same time, preserving the existence of the monastery pharmacies. The latter, however, were doomed to destruction. The apothecaries appealed to the civil authorities to free them from this unfair competition. In 1776 the Elector Max Joseph of Bavaria issued a mandate prohibiting the dispensing of medicines in religious houses within certain limits. He states that complaint was made that the apothecaries were unable to maintain their shops in a state fit for the public good on account of the practice followed in monasteries and convents of selling medicines to the public without discrimination. The medicaments, he says, were prepared and dispensed by monks and nuns who were ignorant of their nature and unqualified to practice the pharmaceutical art; and he, therefore, ordered that the religious houses should close their shops in towns and within a circuit of two hour's distance where apothecaries carried on their business. Failure to observe this mandate was punished with a fine of one hundred ducats. This drastic edict brought forth a petition from the College of Jesuits at Ingolstadt, where a famous public dispensary had been maintained for many years. They claimed exemption from the ruling on the following grounds:

1. Their pharmacy had been in existence for one hundred years and Doctor Naderhirn, Court and Town Physician of Eichstaedt, had for more than forty years obtained his drugs therefrom, a testimonial to their excellence.

2. The pharmacy was presided over by thoroughly competent persons.

3. The Ingolstadt pharmacy was by no means responsible for the decay of the lay apothecaries; the claim that these suffer from the competition of the religious houses is in fact unsubstantial, for there are two in the town of Ingolstadt, who possess more than one shop and are well to do.

4. Whether or not the carrying on of an open shop by a religious order is in opposition to the rules governing such order is a question which the petitioners do not desire to discuss. They call attention to the fact that the practice is sanctioned in Rome and other countries, and they conclude by asking the Elector to confirm their privileges. What answer was given to this petition we do not know. With the dissolution of the order by Pope Clement the Fourteenth in 1773, the Ingolstadt pharmacy became secularized and passed into private hands. In France the circumstances were similar. As everybody knows the Jesuits were the first to recognize the medicinal value of cinchona bark. It was through them, that it was imported into Europe. Encouraged by their successful trade in this drug, they extended their operations and became importers of exotic drugs in general on a large scale. These they sold at retail through their various establishments, a practice which found imitation in other religious communities. The apothecaries prosecuted them and edicts were issued against the Jesuit drug shops, one of 1707 enjoining all convents from keeping medicaments, except for use in their own hospitals. But it was not until the advent of the French Revolution that the practice was finally stopped, when all conventual establishments were sequestrated by the Government.

So the monastic pharmacies arose, flourished, and declined as an independent institution. In those which continued to exist the needs arising with a new order of things, were fully recognized and the practitioners submitted cheerfully to the requirements imposed upon all who would devote themselves to the pharmaceu-

tical art. They pursued the prescribed course of studies, took the state examinations and received their diplomas which put them on an equal footing with their lay colleagues; and the adjustment was a happy one, as is proved by the excellence maintained in the conventual dispensaries in our day, both in Europe and in America.

A LAYMAN'S POINT OF VIEW.*

GOVERNOR W. S. HAMMOND, OF MINNESOTA.

It gives me great pleasure to come here this morning at the very beginning of your deliberations to bid you welcome, to greet you, and to express the hope that the work that you do here may be of benefit to the Pharmacists of the State, to the Pharmacists of the United States and to all the people with whom in your various capacities you come in contact. The pharmacist is a great deal more than the apothecary of old or the druggist of even more recent days. There was a time when the apothecary shop, the drug store, was a sort of gather-as-you-please place to gossip over the events of the day and incidentally and between times to compound various medicinal preparations. The work of the apothecary was a particular and technical kind of work and there was so little of it that the compensation was necessarily quite large. But there has come a great change in recent years. The pharmacist is the scientific man as was the apothecary of old. He is the technical compounder, the registered druggist, but he is more of a business man than his predecessors were, and because of that fact the people, those who trade with the pharmacist, have been the gainers. The whole calling itself seems to have taken on another form. I imagine there is not so much compounding to-day as there was a few years ago. Great pharmaceutical establishments do a great deal of the work that the old-time apothecary did. Now, under these changing conditions, it is very, very advisable, it seems to me, that there be frequent meetings for communication of ideas and thoughts relating to the business among the pharmacists of the state. The average pharmacist has become somewhat of a business man; he has always been to some extent a business man, but I am inclined to think that to-day he is more of a business man than professional man, while sometime ago, he was more of the professional man than the business man. Now, is there any danger growing out of this? Is there anything that you ought to think about in connection with this change, if I am correctly advised and my conclusions are warranted by the facts? It would be unfortunate if this old time-honored profession should become merely business. So much of the sentiment, so much of the romance would be taken away that we might feel somewhat sad at the change, but more than mere sentiment, more than mere romance—it would be another development of the dollar idea. I admire the successful business man. We cannot but be astonished at the great efforts of the captains of industry. We like the strong, pushing, virile business men who start with little or nothing, and build up gigantic enterprises, but they are business men. We

* Address delivered before the Thirty-First Annual Convention of the Minnesota State Pharmaceutical Association, February 9, 1915,—St. Paul, Minn.

would not want our lawyers, our doctors, our apothecaries, our clergymen, to be distinguished principally as mere business men. We like to have them remain in the realm of professionalism, and be as great and as useful in professional work as others are in the business field. Now, I trust that with these great houses compounding so many of the things that the apothecaries themselves compounded not many years ago, that we will not have a change in this line of work, and that the apothecary may remain the professional instead of the business man, realizing, of course, the necessity of good judgment and of business skill in the conduct of any business enterprise. There are very important matters connected with pharmacy that are wholly unrelated to the mere question of bookkeeping and income and outgo. We are all interested, and you are particularly interested, in the legislation tending to restrict the use of noxious drugs. Here is a line of endeavor that of course should be absolutely divorced from the business end of the work. Here is a question that appeals to you as professional men and as men who desire to adapt their profession to the best interests of their brothers and sisters, and any attempt, I fear, to connect this kind of legislation with the business end of the pharmacist's occupation and profession would tend to detract from the high professional standard that the apothecary has always had, and that the modern pharmacist should endeavor to maintain. I am not a pharmacist, but a mere observer. I have spoken simply as a layman in a general way. My purpose in coming here was not to deliver a lecture. I could not hope to impart advice to men and women like yourselves who have studied the subject for years, but I may in a way represent the layman who looks upon the pharmacist as the majority of laymen do—who wishes him well and desires to see the time-honored and highly-respected profession maintain all that is good in it, and push on to high and better results. I welcome this body here this morning. I repeat my greeting. I trust that you will accomplish much for yourselves and much for the benefit of your profession throughout the state and country. I thank you.

THE HARRISON ACT.

F. H. FREERICKS.

All comprehensive narcotic legislation is of comparatively recent origin. The first state in the Union to pass a law governing the sale of cocaine was New York, only twenty-three years ago. This was followed within the next five or six years by similar laws in all of the states. It is with considerable pride that we note all of these laws, as enacted in the various states, to have their origin with, or to have been enacted because of the strong support which they have received from pharmacists.

However, after their enactment, it soon became apparent that the narcotic evil had grown to such proportions that these laws in the different states were insufficient to control it. This was due in part to the inadequacy of the state laws, and in greater part to the fact that state officials were either unwilling, unable, or indifferent with reference to the enforcement of them.

It was about seven or eight years ago, that the matter of a general federal law

governing the distribution of narcotics was advanced for the first time. A few years later Dr. Hamilton Wright, who was at that time connected with the Federal Department of State and a representative of our government at the Hague Opium Conferences, became aware of the enormous amount of narcotics then being used in this country. It is reported that he resolved to secure, in some manner, federal legislation which would control the narcotic evil as it existed in this country, and I want to say to you that the federal law which is before you to-night comes to us primarily through the activity of Dr. Hamilton Wright. He was chiefly instrumental in its introduction in Congress. It then first attracted the greater attention of Pharmaceutical Societies, most of which went on record as favoring such a law. Congressman Foster, of Vermont, introduced the original bill, the underlying purpose of which was the control of narcotics, but however little was done toward securing its enactment, for several years. Then Dr. Wright with persistent effort, using his influence with men of standing and power, induced Congressman Harrison, now Governor of the Philippines, to introduce his bill first known as the Foster Bill, but now known as the "Harrison Act." Both Foster and Harrison had little to do with the drafting of the bill.

It was three years ago, that it became generally known that stronger effort was being made to enact a law of this kind. The American Pharmaceutical Association, then in session at Denver, decided to call a conference of the various National Drug Societies throughout the country for the purpose of coming to some decision in the matter. At the conference so called together there were gathered representatives from the various National Pharmaceutical Societies, including manufacturing chemists, and the National Wholesale Druggists' Association. They considered the bill in all its phases, and soon found that it contained an enormous number of impossibilities, not that it was the intent to cause unnecessary trouble, but because the man who had drafted it lacked the necessary practical experience to know how to make it meet the practical needs. Dr. Wright was persistent to have his draft adopted, and the bill was to be brought before the House on the next day. The National Drug Trade Conference proceeded immediately to formulate its objections and presented them at a meeting of Congressman Harrison's Committee arranged for that purpose. There were present at this meeting representatives of the American Medical Association, the Veterinarian Society, Dental Association, and representatives of various other National bodies connected with medicine and pharmacy. After the objections were presented, it became apparent to the Committee in charge, that the Bill, as it was, could not be, and should not be, enacted into a law. It was the decision of Chairman Harrison of the House Committee that Dr. Hamilton Wright and the Drug Trade Conference should together draft a National Narcotic Law, and that he would then see to its enactment. On the same evening and extending through the following days, the conference of the National Drug Trades met with Dr. Hamilton Wright, without coming to an agreement, and this resulted in many subsequent meetings. It should be mentioned that the National Drug Trade Conference at its organization decided that delegates representing all the National Societies interested in this law should be invited to attend its future meetings. I wish to say that in all the sessions that took place for two years thereafter, there were invariably present, representatives of the American Medical Association, who took part in the discus-

sion. I am free to say that, in my judgment, the representatives of the American Medical Association either directly or indirectly have been more largely instrumental in having this law passed as it is to-day than any one set of men constituting the Conference. The representatives of the American Medical Association most prominent in the discussion were Dr. Woodward, of Washington, and Mr. M. I. Wilbert.

Now, I do not mean to go beyond what I have said in speaking of the law and how it was secured, other than to say that Federal Narcotic legislation is, I believe, an essential thing, to supplement State Laws, in view of the fact that the narcotic evil has grown by leaps and bounds until to-day there is not a week passes but that at least 100 arrests for the violation of state laws, as they now stand, are made. It must be plain that, where there are regularly on the average 100 arrests weekly for the violation of a given law, there are many, many more times that many violations.

I have been presented to you as a member of the National Drug Trade Conference. I refer to that fact, because in what I am likely to say, I do not want to be misunderstood. I did have the honor of representing the National Association of Retail Druggists in the Drug Trade Conference, but I wish to say that the form of bill which has now become a law found the more or less willing approval of 14 members of said Conference,—two subsequently dissenting,—and did not find and has not yet found the approval of one member of that Conference, and that member is myself. I tell you this so that I may not be misunderstood. I am not prepared to defend in every respect the form of the law as it now stands, nor am I prepared to defend all the regulations that have been drafted under the law. But it seems to me that the question is, not whether we like the law or whether we like the regulations which have been drafted under the law, but *that we have the law, and we want to know what it is and how it applies to us.* While I am not prepared to defend every provision of the law, yet its aim I am prepared at all times to defend.

The law we are discussing this evening is known and will be known as an Act of Congress approved the 17th day of December, 1914. It will also be known as the Federal Narcotic Revenue Act. Its regulatory provisions are an incident to the taxing powers. The law contains twelve sections, the three last of which concern the government and its officials. To my mind, it seems, first of all, that the ninth section is the most important. It provides that any person who violates the Act is subject to a fine of not more than $2000.00, or to imprisonment of not more than five years, or both. This alone seems sufficiently important to awaken all of us to the necessity of complying with the provisions of the law.

In Section 1, the law provides that "Every person, partnership, association, company or corporation who produces, imports, manufactures, compounds, deals in, distributes, sells or gives away opium or coca leaves, or any compound, manufacture, salt, derivative or preparation thereof, and not specifically exempt, must, on or before the first day of March, 1915, register with the Collector of Internal Revenue of the district" and pay the special tax imposed for the period, March 1, 1915, to June 30, 1915, amounting to thirty-four cents. That means that every person who is in possession of these drugs with a view of supplying others, no matter in what form or under what circumstances, must be registered under this act. I

should here say that Section 6, by inference, provides that there should be included in the list of drugs specially named under Section 1, alpha and beta eucaine, or any synthetic substitute for cocaine. The field of synthetic substitutes for cocaine and eucaine, including novocaine and alypin, should be constantly in mind.

From now on, for the sake of brevity, I shall use the term "Doctor" to refer in a general way, not to doctors alone, but to dentists and veterinary surgeons, unless for some reason, it becomes necessary to specifically refer to one of them. I understand that the local Collector of Internal Revenue has distributed the Blanks for Registration among the doctors, but unless you have had such application, it is necessary for you to either go or write to the Collector of Internal Revenue for your District, and have him send you an application to register under the Federal Narcotic Act, and to have the necessary revenue stamp. I would suggest that you write for a requisition form upon which you will have to secure the so-called official order forms, which are also furnished by the Internal Revenue Collector. After receiving your application form, go to the Internal Revenue Office, or to a notary, to be sworn, then send it in together with the specified tax. If you see fit to make requisition for order forms, send an additional ten cents. The order forms are done up in tablets of ten forms each. Your remittance will need to be made in U. S. Money Order, cash, or certified check. Forty-four cents covers the tax until July 1, 1915, and ten duplicate order forms. After that date an assessment of $1.00 is made for the ensuing year, and ten cents for each ten order forms in duplicate.

Doctors must register but once, and that from their office. Druggists, however, are required to register from each separate place of business that they may conduct, and, under a ruling of the Commissioner, which I have, they are required not only to register for the purpose of dispensing on physician's prescriptions, but they are also required to register for the manufacture and sale of narcotics. In other words, a druggist must register under two separate provisions. Certain classes have been provided for, one for Doctors, Dentists, and Veterinarians. In another class belong the manufacturer and the wholesaler, and in still another class, the pharmacist who would sell only on prescriptions. The Druggist under above-mentioned ruling, which may be changed, will need to secure registration both for selling and manufacturing, and again for the purpose of selling at retail on prescriptions, so that each retail druggist, if he has but one store, will have to register twice. The doctor, druggist or dentist who may have an office and a separate residence should register from the office only, but if his office is not separate from his residence, it is, of course, necessary to register from his residence.

The law in Section 1 provides that employees who act within the scope of their employment, and are employees of registered doctors or druggists, do not need to be registered. That is important, because under Section 8 of the law, it is made unlawful for any person other than those who are registered to be in possession of any of the drugs, except in cases of certain exemptions, which will be later referred to.

Under Section 1, the law does not apply to County, State, or Municipal Hospitals, or Penal Institutions, and it does not apply to the Doctor who is engaged

therein, when so engaged. In other words, such county and municipal hospitals are not required to register under the act, and they may purchase the drugs and no record need be kept of the supply to such institutions. The Doctor who visits such *public institutions* is not required to make record of any of the drugs he may order therein, but in private hospitals, the Doctor is required to give to the person dispensing the drug, some authority for doing so. The best way to order narcotics in private hospitals would be to write prescriptions, and for the druggist at such hospitals to fill only under prescription. That applies to private institutions, and in private hospitals, it is always necessary, for the Doctor to make a written order *not to be kept by him,* but to provide a record to be kept by the person who supplies the drug in the house.

With reference to veterinarians, many, I believe, conduct hospitals of their own, and whenever this is the case, they are, under the regulations of the department, required to make a record of all the drugs they would dispense and use in their hospitals.

Under Section 8, possession of the drugs by unregistered persons becomes absolutely unlawful, except in cases of specified exemption, and when these drugs are found in the possession of any unregistered person, it is for that person to prove that he is in lawful possession of them. Possession is lawful when in the hands of a person acting within the scope of his employment. Possession for a registered person is lawful when found in the hands of nurses to whom they have been given by the Doctor, when they are used under the supervision of the Doctor, and only in such cases is possession of narcotics by nurses lawful unless they are registered. They must come from the doctor to the nurse for use in administering to the patient of that doctor, and in no other way.

Possession is lawful for those who have it because of a doctor's prescription, or to whom as a patient it has been given by the doctor.

There is one very important exemption with reference to preparations that contain some of these drugs in minimum quantities, and I would make clear that this includes preparations on physician's prescriptions. This exemption is with reference to preparations that contain, in the fluid or avoirdupois ounce, not more than 2 grains of opium, nor more than a ¼ grain of morphine or its salts, nor more than ⅛ grain of heroin, nor more than 1 grain of codein. In other words, an ounce may contain not more than two grains of opium, not more than a quarter of a grain of morphine, or ⅛ grain of heroin, and not more than a grain of codein. If it *does* not contain more than these quantities, then the act does not apply in any shape or form. Preparations for external use that are in good faith intended for external use may contain any quantity of opium, or any quantity of the derivatives of opium. Neither the doctor nor the druggist is required to make a record of such distribution. It is a question as to whether suppositories should be regarded as being for external use. I do not believe that the pharmacist would be allowed to sell suppositories unless upon a doctor's prescription. No preparation intended for either external or internal use may contain any cocaine, alpha or beta eucaine, nor any substitute for them, unless it be on doctor's prescription or record.

There is an exception with reference to decocainized coca leaves, or, in other words, the leaves or its preparations from which all cocaine has been removed.

Section 2,—the most important section of the law, in so far as it concerns us all, provides that the sale and distribution of the narcotic drugs may now be made only on an official order form excepting certain exemptions. There can be no sale by the manufacturer or by the jobber to either the doctor or the druggist, unless it be on this official order form, which has been specially drafted by the internal revenue department, and is supplied by the collector of internal revenue. It will contain your registry number and bear your name, and you will retain this number throughout the period of registration and also when you re-register. Each order form, when filled out, must carry the date of the order, also your signature, registry number and address. It must be made in duplicate, and the original is sent to the manufacturer, to the jobber, or to the pharmacist, and must be preserved by them for two years. It must be filed by the person or firm filling that order in its regular numerical order. For instance, all orders from a person registered as No. 95 must be filed together, no matter when they come. The doctor or druggist who places the order, is required to keep his duplicate when order is filled, for two years in a place readily accessible for government officials who are charged with the enforcement of the act.

All sale and distribution of narcotics, as stated, must be upon official order forms, excepting in instances governed by sub-section (a) and (b) of Section 2. The drugs that the doctor, dentist, or veterinarian supplies to his patients upon whom he *personally attends,* need not be recorded on the official order form. Under a regulation which the commissioner has promulgated it is ruled by him that personal attendance *means personal visits,* and the doctor is required to make and keep a record of all the drugs that he would dispense, to his patient, at the office, but he need keep and make *no record when he visits the patient at his home.* In other words, the doctor is not required to make or keep a record when called to attend a patient at the patient's home. He may there dispense all the drugs necessary without being required to make or keep a record. But when the doctor dispenses in his office, he must make a record of that he dispenses. He may select any kind of record-book that suits his fancy, but it must be kept specifically for that purpose, and he must enter therein the name, and address of the patient, and the date, and quantity of the drug dispensed to that patient. This applies also to the administration of hypodermic injections of narcotics in the office, but not at the bedside of the patient. This must be done regardless of the quantity that may be administered. This applies to dentists as well. Every time a dentist uses cocaine or a synthetic substitute in a dental operation, he will have to make a record of it in his office. I have already stated that when the doctor prescribes these drugs in private hospitals, he must provide the means of recording to the person who gives the drugs. The most ready way is to write a prescription to be filed by the pharmacist, or it can be noted on the chart containing the patient's hospital record. Private hospitals are required to show what they have done with narcotics bought on official order forms, and there will be no way to do this unless the doctor gives them some written order.

Now, I have stated that any kind of book that suits you, can be used as a record book, but it must be used exclusively for recording the distribution and the dispensing of these drugs. I would suggest that it be used also to keep therein your

duplicate copy of orders that you may give, and also an inventory to which I will refer later.

After the first day of March, no pharmacist will be permitted to fill your prescriptions for these drugs unless you are registered under this act. The prescription which you write must contain your registry number, your name and address, the name and address of the patient, and finally, of course, the quantities ordered, and the doctor's full signature. Pharmacists may not fill prescriptions wherein these requirements have not been fulfilled, except, of course, with reference to compounds that may be ordered on prescription which contains not more than the minimum quantities allowed.

The question has been raised as to whether a doctor might not, after having written a prescription meeting all the requirements of the law, order such prescription refilled in writing. This is a matter that has not been ruled upon. However, I should think that, if the prescription-blank upon which the doctor would order a re-filling of the first prescription, complies with all the original requirements, then he should be authorized to write "Re-fill prescription, No. ——," and the pharmacist should be authorized to refill it. The pharmacist, when he receives a doctor's prescription for any of these drugs must keep it upon a separate file. He may number his prescriptions in their regular order, but those containing these drugs beyond the exempted quantities, must be kept on separate files by the pharmacist. If the pharmacist does not choose to keep them on separate file, he is required to keep a record-book in which he must enter, in each instance, the name, address of the person for whom the prescription is intended, and the name of the doctor. He must use one of two ways. The most practical way, in my judgment, would be to keep two files, to number the prescription in its regular consecutive order, and to keep those containing narcotics on separate file, referring thereto by memorandum on the principal or regular file. Let me say to my friends, the druggists who are here, that if I were still in the drug business, I would find out from my neighboring doctors and dentists what their registry numbers are, as soon as possible, and then have prescription blanks made for them to contain these numbers and addresses. I make that suggestion purely from a practical point of view. Under Section 3 of the Harrison Act, every person who has registered and who buys these drugs and has them in his possession, may be called upon to make a sworn statement as to what drugs he has purchased during three months prior to the time of such demand for a statement. During three months prior to the demand for a statement, you may be asked by the collector to give an account of all such drugs you have purchased, the quantities of the same, from whom and when purchased. You may be called upon at any time by the collector of internal revenue to make a sworn statement to the foregoing effect.

These requirements are made in order to ascertain the violators or those who are likely to be violators. In other words, if the collector of internal revenue finds from the sale of official order forms that any person seems to be using an out-of-proportion number of them, you can look for him to make the demand in that connection. After the first day of March, any person who supplies the consumer with narcotics, must make an inventory of all the drugs in his possession. It must be completed and sworn to by the person, on or before the fifth day of

March, and then must be filed by that person, so that when the inspector calls upon him within two years, he may be able to produce it. My suggestion would be to file this inventory with the record-book, or with the duplicate copies of your official order forms. The inventory must include everything,—the drugs themselves, the preparations that contain the drugs in more than the quantity exempted,—and then be filed by you for inspection of the authorities at any time within the next two years.

With reference to the registry number of the physician's prescription, there is no specific form or requirement. It is only necessary that the prescription shows your registry number, name and address. My suggestion would be that the following words be used:—"Registry No. ——, under Drug Revenue Act of Congress, approved December 17, 1914." This may be just at the upper left-hand corner of the prescription. This, it seems to me, would prove in every way satisfactory.

The law also concerns itself, in Section 4, with the drugs that may be carried from one state to another. It is altogether unlawful for any one to carry or to ship narcotic drugs from one state to another, if he be not registered. There are also exceptions to this provision. An employee of a registered person acting within the scope of his employment, may carry them from one state to another, and a Common Carrier may do so. Persons who purchase the drugs upon a written prescription from a doctor, may carry them from one state to another. Persons to whom a doctor has dispensed such drugs, and has made a record of the dispensing, may carry them from one state to another, but in no other case may persons carry these drugs from one state to another.

This brings me about to the end of the Act. I have sought to prepare briefly for you and in just a few words, the important things that apply to the doctor and to the druggist. *First* of all, the doctor and druggist must register. He must secure an application blank, fill it out, swear to it and send it to the collector of internal revenue, and all this must be done before the first day of March. The blanks can be secured and filled out in the office of the Internal Revenue Collector. He must send with his first application for registry thirty-four cents cash, money order, or certified check, and an additional ten cents for ten duplicate copies of the Official order form. *Sceond*, the doctor should secure a record-book, which he will use exclusively for recording such of the drugs as he may dispense at his office. My suggestion would be that he paste in this book the inventory that he is required to make on March 1st, make affidavit to same, and keep. I would suggest furthermore, that he paste therein all the duplicate copies of orders that he may give when purchasing the drugs. The druggist must on March 1st make and swear to his inventory and sell only on official order form, on doctor's complete prescriptions.

I have tried to set before you the important features of this law. I would add that, to me, it seems that the burden of this Act upon the doctor, the druggist, the dentist and the veterinarian, is more imaginary than real. I would also say that, when enforced, it will not cause the trouble that may be apparent when you first study it. When new, it takes a little time to set machinery in proper motion, but when in proper motion, it is neither difficult nor burdensome. I have said that I am not prepared to defend this law in its every feature, nor the regulations that

have already been made, and I am sure there will be added some changes in these regulations. You must bear in mind that the Commissioner of Internal Revenue, more than likely, never heard of these drugs until a month or so ago. We must be reasonable with him. The law has been enacted because of the need of humanity and because of the need of this country. I ask of you to give it your kindly and whole-hearted support, even though it may seem at first to infringe upon your rights and privileges. Let us consider it an essential thing for the good of this country, Let us accept it in the proper spirit, to the honor and credit of the professions.

SOME THOUGHTS ON AN EFFECTIVE PHARMACY LAW.*

ROBERT L. MORELAND.

The object of a pharmacy law is to regulate the practice of pharmacy by protecting the public from ignorant and incompetent persons attempting to practice the art. An act usually begins by creating a Board to enforce its provisions; orders examinations to be held and fixes fees; states the qualifications required of the applicants; provides sometimes for registration of pharmacists from other states; defines drugs and poisons; provides penalties for violations, etc.

Only those who have been charged with the enforcement of such a law as is usually enacted, can realize how difficult it is to carry out its provisions,—advantage is taken of every technicality to defeat its purpose and by none more than by pharmacists themselves. On one occasion, in recent years, the Minnesota Board of Pharmacy failed to get a conviction against an unregistered druggist who sold tincture of iodine. At the trial it was deliberately sworn to by a witness that the only use he knew of for tincture of iodine was the purely technical one of *cleaning cuspidors* and that was what the Iodine was to be used for. On another occasion, after an expenditure of several hundred dollars, the board failed to convict a general store-keeper for selling Strychnine, the defense being that the employee who sold the poison was *forbidden to sell it,* although strychnine was regularly stocked and kept for sale.

Most of our pharmacy laws are very defective. A pharmacy law to be effective, should be carefully worded and should specifically state what may be done and what is forbidden, with the fewest possible exceptions and the least superfluous verbiage. It should clearly define the duties of the Board charged with its enforcement and should make the penalties for violations clear and concise and should prescribe the most effective method of legal procedure that can be defined for its enforcement. Then as to what such a law should embody. If the same principles were applied to pharmacy that are embodied in the laws regulating the practice of medicine, dentistry or veterinary medicine, it would do away with one of the greatest troubles in regulating the practice of pharmacy, viz., that none but an individual or individuals duly licensed should be allowed to own or conduct a pharmacy. I mean that unlicensed individuals, co-partners and stock companies

* Read before Thirty-first Annual Convention, Minnesota State Pharmaceutical Association, St. Paul, February 10, 1915.

have no moral right to engage in pharmacy by merely hiring one or more registered persons to conduct it for them. How long do you suppose a stock company of farmers, mechanics or pharmacists, would be allowed to practice law or open an office or offices as physicians or dentists? Why should not pharmacy be regulated along precisely the same or similar lines as the professions of law, medicine and dentistry?

It may be said in reply that there is a commercial side to pharmacy. So there is, but if the commercial side be the greater or more important, it should be divorced from the scientific or professional side, and those who wish to conduct a drug store and sell all the side lines that are now connected with the drug business, should be allowed to do so, and sell drugs, but they should not be allowed to compound any medicinal preparations or prescriptions. The qualifications for such a person should be not less than three years' practical experience and they should be required to pass a very simple examination covering the identification, nomenclature and physical properties of the various drugs and simple preparations commonly sold in a drug store. The man who can weigh out and wrap up a quantity of powdered rhubarb or gentian from a labeled bottle, the quality of which he is unable to determine, or pump from a can, glycerine, the specific gravity and purity of which he is ignorant and has no means of testing, is in no sense a pharmacist but a mere vendor of drugs.

The public has a right to expect that any person who is a licentiate of pharmacy should be competent to compound prescriptions and medicinal preparations carefully and accurately, and to manufacture pharmaceuticals conforming to official standards. This can only be obtained by raising the standard of requirements for pharmacists. For registration as a pharmacist, the applicant should have the necessary training and experience to enable him to compound prescriptions carefully and accurately, and to make all the U. S. P. and N. F. preparations that can be properly prepared on a small scale. He should be able to test and assay his chemicals and such drugs as are capable of assay, and to apply the necessary tests for the identity and purity of official substances and to conduct volumetric and gravimetric analysis.

A minimum of five years' experience should be required of every candidate before he is eligible for examination as a pharmacist, two years of which might be spent in school of pharmacy and he should have been registered as an assistant for at least two years. For an assistant pharmacist a minimum of three years' experience should be required, two of which might be spent in a school of pharmacy, and the candidate should be registered as an assistant for at least two years before he should be eligible to take the examination for pharmacist. There should also be an apprenticeship system, apprentices to be registered on passing an examination such as is now given by the Minnesota State Board of Pharmacy or else present a high school diploma, when they would be registered as an apprentice, and all experience should count from date of such registration.

The law should contain a provision that the keeping open to the public by an unregistered person of any store, shop or place for the sale of drugs, medicines or poisons, should be considered as *prima facie* evidence of a violation of the law. In this state drug stores are conducted by unregistered owners, often in the same towns with registered proprietors, the former of whom never employ registered

help and refuse to sell to strangers. They go on unmolested because the board cannot get evidence on which to begin a prosecution. This feature was embodied in the draft of the amendment to our pharmacy law passed in the last session of our legislature, but I believe it was opposed by some of the members of this association and probably for that reason was omitted from the bill.

The name of the pharmacist conducting the store should be conspicuously displayed on its front and should be on all labels. Physicians, unless they are registered pharmacists, should not be allowed to compound medicines. A physician without any pharmaceutical training, who attempts to compound a prescription, is as much a fakir as a pharmacist, who pretends to diagnose disease and prescribe therefor. Owing, however, to the enormous political power wielded by the American Medical Association and similar bodies it seems to be impossible to keep physicians strictly to their own profession.

Private hospitals, which are alarmingly on the increase and for which there is no need unless to increase the bank account of their owners and provide a safe place to get their experience, should be under the supervision of the Board of Pharmacy, the same as drug stores, and should have a pharmacist in charge. The same regulation should apply to every public hospital and their stock of drugs should be subject to the same inspection and should be kept up to the same standard as the drugs in pharmacies.

The Board of Pharmacy should be supported as at present by renewal fees. This method of supporting a State Board of Pharmacy is much better than that of receiving state aid, as, in every state, politicians try to influence examining bodies, but more particularly every state-supported body. In some states such boards are entirely political which is much to be deplored.

The difficulties encountered in framing pharmacy laws in the past, have been principally on account of the general opposition that seems to be made by legislatures to everything pertaining to pharmacy, and the want of coöperation among pharmacists. The differences of opinion and petty quarrels in their own ranks, have prevented them from presenting the proper arguments in behalf of their requirements and from maintaining a united front against the vicious legislation which is frequently attempted to be forced upon them. In this respect they are much less a power in the various states than those in many other lines of business, which is not as it should be.

I think, however, and most sincerely hope, that we have turned the corner, and that the pharmacy of the next generation will be a distinct improvement on that of the last and that physicians will expect more of and coöperate more with pharmacists and that there will be fewer nostrums manufactured and prescribed and we will get back to the days of prescribing and dispensing U. S. P. and N. F. preparations, instead of the various fanciful mixtures at exorbitant prices and the humbugs with which the market has been flooded for the past twenty-five years.

If such conditions come about, it will be necessary to have better trained pharmacists than we have to-day and pharmacy laws will have to be made more effective or become dead letters, which would mean a retrograde step of half a century in the practice of pharmacy. If ever there was a time in the history of pharmacy when the public needs protection from unscrupulous, ignorant and incom-

petent persons, it is in this age. The old simples of our fore-fathers have given away to complex preparations, active and poisonous principles, heretofore unknown and now in daily use. The pharmacist of to-day must be a pharmacist, chemist, and analyst combined.

I am aware that these few thoughts will call forth a good deal of criticism. They are deliberately written for that purpose and hostile, as well as favorable criticism, will be welcome, as it is only by criticism of proposed or accepted methods that we can ever hope to arrive at even a partially successful conclusion.

BACTERIAL *v.* VEGETABLE TOXINS.

J. STANLEY WHITE, PH. C.

In these days when the value of such products as antidiphtheria serum and antitetanus serum are recognized on all sides as being unique in their respective spheres, it is interesting to recall that it was as the result of the study of a product obtained from a purely vegetable source that these biological products assumed a practical form. The substance referred to is ricin, the tox-albuminoid principle found in castor-oil seeds, and a comparison of this and allied substances, both of vegetable and animal origin, with similar products elaborated by bacteria may not be without interest.

It is only comparatively recently that the existence of poisonous proteids or toxalbumins has been recognized. The idea that a proteid can produce dangerous or even fatal symptoms or act in any way except as a food dates only from 1884, but, according to Cushny, most of the animal poisons are now believed to be of proteid nature, and the toxins formed by micro-organisms of disease are almost certainly of the same class.

The most important toxins or toxalbumins of the vegetable kingdom are ricin, abrin, and crotin. The two latter are obtained respectively from the seeds of *Abrus precatorius* (jequirity) and *Croton Tiglium,* but they closely resemble ricin, and it will only be necessary here to refer at any length to this last-named substance.

Ricin is an intensely poisonous phytoalbuminose, which may be obtained from castor-oil seeds after the removal of the oil. It occurs only in the endosperm and embryo, where it is present to the extent of 2.8 to 3 *per cent.,* and may be obtained from fresh decorticated and strongly expressed seed by percolation with a 10 *per cent.* saline solution in which it is soluble. The percolate is filtered and saturated at 20° to 22° C. with magnesium sulphate, and the resulting white precipitate separated from the crystallized salts by dialysis. This preparation is not pure ricin, and probably contains a large proportion of albumins. As thus obtained, ricin is a white, odorless, strongly toxic, ash-yielding powder, insoluble in alcohol, ether, and chloroform.

The chemical nature of ricin appears to be analogous to that usually ascribed at the present time to the bacterial toxins and ferments, and the name toxalbumin, originally suggested by Kobert and Stillmark, who first investigated the substance,

is abandoned. Ricin differs in a marked manner from the bacterial toxins and snake venoms by its relative stability towards the natural fluids and ferments of the alimentary tract. For this reason it appears to be absorbed by the intact alimentary tract, and thus may act as a poison when administered by the mouth. The action of ricin is, however, much less powerful in the stomach than when injected hypodermically. The toxicity of the substance is enormous, and it may certainly be regarded as among the most powerful vegetable poisons when injected directly into the blood.

According to Ehrlich, 1-2000th grain per 2 lbs. body weight is fatal; 1 gm. (15.43 grains) subcutaneously is sufficient to kill one and a-half million guinea-pigs, while the lethal dose for man is supposed to be 0.30 gm. by the mouth or 0.003 gm. subcutaneously. It should, of course, be remembered that these figures do not refer to pure ricin, but to ricin contaminated with more or less albumin. Smaller doses, injected hypodermically, soon produce immunity, antiricin being formed.

As previously stated, the observation of Ehrlich of this protective reaction laid the foundation of serum therapeutics. Before discussing the production of antiricin it may be as well to briefly consider the toxins elaborated by bacteria. When pathogenic bacteria grow and multiply in the body, symptoms of poisoning (toxæmia) are manifested; consequently it was inferred that bacteria either produced poisons during their growth or contained poisons. Subsequent experiments proved that the poisonous effects of a few bacteria which passed out into the surrounding media, and the poisonous effects of the other class, seemed to be due to the actual constituents of the bacterial cells. The former are termed exotoxins or extra-cellular toxins, and the latter endotoxins or intra-cellular toxins. Some bacteria, on the other hand, notably the tubercle bacillus, elaborate both exotoxins and endotoxins. These toxins are substances of a very complex composition, probably allied to the proteins. In some instances they appear to be of the nature of enzymes or ferments, and they are direct products of the bacterial cells.

Among the few bacteria producing extra-cellular toxins or exotoxins the bacillus of diphtheria and the bacillus of tetanus are the most important. They are extremely poisonous; in fact, it has been computed that the toxin elaborated by a virulent culture of the bacillus tetanus is the most potent poison known to science to-day. These exotoxins being excreted by the bacteria, are found in solution in the liquid culture media containing the growing micro-organisms. Serum from an animal immunized by injecting into its body small and increasing doses of these soluble toxins, administered at regular intervals and given over a long period of time, is rich in antitoxin. This antitoxin, when properly prepared and standardized, constitutes the antitoxin of commerce. Diphtheria and tetanus antitoxins are prepared in this manner.

In the case of the bacteria which do not secrete a soluble toxin, the killed bacteria themselves are used for immunization. They constitute what are known as the antimicrobial serums, a familiar example of which is antistreptococcus serum, and should be distinguished from antidiphtheria and antitetanus serums, which are strictly antitoxic in nature.

Antiricin may be produced in exactly the same way as an antitoxin; in fact, an-

tiricin might be described as a vegetable antitoxin. Rabbits have been immunized by gradually increasing doses of ricin until they have obtained an immunity of 5,000, or, in other words, have developed so much antiricin in their blood serum that they are not affected by 5,000 times as much ricin as would have killed them had no preliminary treatment been instituted.

The immunity acquired for both ricin and bacterial toxins is entirely different from the tolerance acquired for morphine and other drugs. According to Cushny, the latter is due to the cells of the body becoming accustomed to being constantly bathed in a fluid containing the alkaloid. The same tolerance is acquired by various marine animals, which would be killed if suddenly changed to fresh water, but which are gradually acclimatized if the change is made more gradually by adding increasing proportions of fresh water to the sea water of the aquarium. In the case of ricin and bacterial toxins the immunity is due to formation in the body of a substance which antagonizes the original poison and constitutes what is known as an antitoxin. This antagonistic substance circulates in the blood, and can be withdrawn from the immune animal and injected into a second, which then acquires a certain degree of immunity, although less than that of the first. Just as diphtheria antitoxin and tetanus antitoxin are antagonistic only to their respective toxins, so also antiricin is antagonistic only to ricin and does not protect an animal from any other form of toxin.

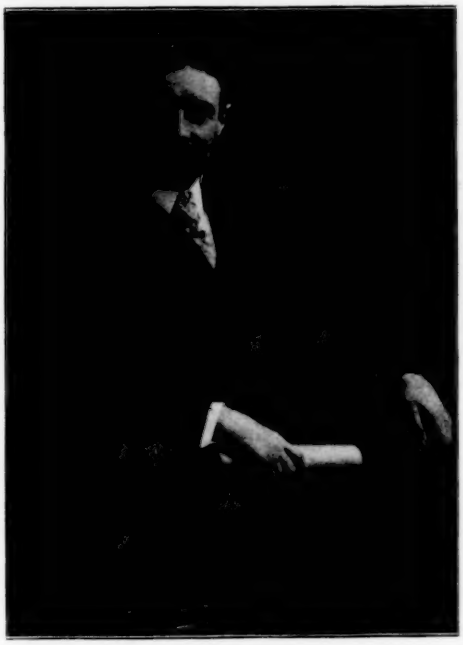
Various animal poisons, such as snake venom, spider toxin, and eel serum, have been found to act in a similar manner although, apart from bacterial toxins, snake venom is the only one used for therapeutic purposes. By means of this an antitoxin has been produced which has marked prophylactic properties against snake bites, and is used extensively in countries where poisonous snakes abound. In addition to the vegetable toxins—risin, abrin, and crotin—toxins have also been obtained from poisonous mushrooms.

While antiricin has no practical therapeutic value, yet it was as the result of the study of this remarkably interesting substance that Ehrlich arrived at a practical method of standardizing the bacterial antitoxins, thus establishing a definite antitoxin unit value for these products.

It is not within the province of this article to discuss the physiological methods employed in standardization or the ingenious side-chain theory which Ehrlich evolved to explain the probable action of the antitoxins in producing immunity. Suffice to say that the discovery of ricin paved the way for some of the most wonderful products used in medicine to-day. It is only necessary to consider the tremendous number of lives which have been saved by the timely use of antidiphtheria serum, and particularly antitetanus serum in the present campaign, to fully appreciate its importance.

Pharmaceutical Journal of Great Britain, Feb. 6, 1915.

"Education is a companion which no misfortune can depress; no crime destroy; no friend alienate; no despotism enslave; at home, a friend; abroad, an introduction; in solitude, a solace; and in society, an ornament—without it, what is man?"



THOMAS F. MAIN.

PRELIMINARY ANNOUNCEMENT.

Committee on Transportation of American Pharmaceutical Association.

Your Committee takes pleasure in announcing the following very favorable excursion rates for members who propose to attend the next annual convention to be held in San Francisco, August 9 to 15 inclusive. The rates are so low as to afford an admirable opportunity of seeing at a minimum expense our great Western territory, the grandeurs of the Rocky Mountains and the beauties of the Pacific Slope, as well as visiting the Panama-Pacific Exposition, in one of the magnificent buildings of which the meeting of the Association will be held.

The railroad fares quoted are for round trip tickets, good for three months, with stop-over privileges west of Chicago.

Direct routes may be described as all running directly into California without passing through Oregon or Washington. Via Portland includes Northern Pacific R. R. (for Yellowstone National Park), Great Northern R. R. (for Glacier National Park), Canadian Pacific (for Banff, Lake Louise, Field Glacier, etc.)

Tourist sleepers are not available generally east of Chicago, but are attached to through Chicago trains leaving Boston, via Boston & Maine and Wabash route on Mondays, Wednesdays and Fridays. New York passengers via West Shore and Wabash can board these cars at Rotterdam Junction. A special tourist or Pullman sleeper can be reserved for parties of 24 and upwards.

The sleeping car rates named are for continuous service; for stop-overs enroute, an extra charge is made which is partially compensated by using the cars for sleeping purposes and thus saving hotel bills.

FARES TO SAN FRANCISCO AND RETURN.

			Sleeping cars—one-way rate			
From Boston—	Direct routes.	one way via Portland.	Pullman lower.	Pullman upper.	Tourist lower.	Tourist upper.
N. Y. C. Lines	$104.20	$121.70	$18.50	$14.80		
Boston, B. & M. via Wabash	101.20	118.70	18.50	14.80	$9.75	$7.40
New York, N. Y. C. & Pa. Lines	98.80	116.30	18.00	14.40		
Differential Lines	94.30	111.80	18.00	14.40		
West Shore & Wabash	94.30	111.80	18.00	14.40	9.25	7.40
Philadelphia	95.20	112.70	17.50	14.00		
Baltimore	92.95	110.45	17.50	14.00		
Washington	92.95	110.45	17.50	14.00		
Chicago	62.50	80.00	13.00	10.40	7.00	5.60
Cincinnati	70.25	88.40	14.50	11.60		
St. Louis	57.50	75.00	12.50	10.00		
Atlanta	72.55	95.00	14.50	11.60		
Savannah	80.50	104.50	15.00	12.00		
Jacksonville	80.50	104.50	15.00	12.00		
New Orleans	57.50	83.75	11.50	9.20		
St. Paul	63.85	74.95	13.00	10.40	6.75	5.40
Denver	45.00	62.50	9.00	7.20		

With the above settled rates for transportation, members are now in a position to make up parties from their respective cities and arrange for suitable stop-overs at points of interest en-route, suggestions as to which will appear in a later announcement.

THOMAS F. MAIN, Chairman,
166 Chambers Street, New York.

February 25, 1915.

Of General Interest

The Journal of the American Medical Association contains in its issue of February 27, an interesting article upon Hall's Antidote for Arsenic, a description of which was published in the February issue of the Journal.

The article is by Dr. Henry G. Barbour, Assistant Professor of Pharmacology at the Yale University of Medicine.

The results of his investigations are summed up in the concluding paragraph of his article as follows:

"The foregoing results indicate the apparent futility of parenteral treatment of corrosive sublimate poisoning by such a good precipitant of mercury as Hall's solution. As an adjunct to stomach washing it will quite possibly be found equal in value to tannic acid, white of eggs, or milk, etc., which are now employed."

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Frank G. Ryan, president of Parke, Davis & Co., is recovering from a painful injury to his right foot which was inflicted as he was getting off a street car in Detroit, Saturday evening, February 13. While trying to avoid stepping into a puddle of water beside the car track, as he left the rear platform of the car, Mr. Ryan slipped and fell, with the weight of his body upon his foot. He was taken to Harper's Hospital in Detroit, where it was said that he had broken the bones in his foot in two places. He is now resting comfortably, but it is feared that it will be some time before he has recovered entirely from the fracture.

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DRUGGIST'S SUPPLY CORPORATION.

The first convention of this body was held on Monday, February 15, continuing through the week.

This organization, composed of forty-seven wholesale drug houses, made a display of the output of manufacturers of druggists' sundries at its show-room at 181 William street, which was of much interest.

The officers of the corporation are:—President, Dr. William Jay Schieffelin; First Vice-President, Charles Gibson; Second Vice-President, Clayton French; Treasurer, William P. Ritchey; Secretary, Francis E. Holliday; General Manager, William L. Martin. The Executive Committee consists of Messrs. Gibson, Ritchey, Holliday, Albert Plaut, and Dr. Schieffelin.

At the luncheon on Friday, interesting addresses on the activities and purposes of the syndicate were made by the president, Dr. William Jay Schieffelin, of Schieffelin & Co., New York City; L. R. Kauffman, of the Kauffman-Lattimer Co., Columbus, Ohio; S. A. Foot, of Lehn & Fink, New York; E. T. Faxon, of the Faxon & Gallagher Drug Co., Kansas City, Mo.; W. T. Carver, of Farrand, Williams and Clark, Detroit, Mich.; Francis E. Holliday, general representative of the National Wholesale Druggists' Association and William L. Martin, general manager of the syndicate.

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Prof. C. H. La Wall, a member of the faculty of the Philadelphia College of Pharmacy and chemist for the Pennsylvania Dairy and Food Commission, while exercising in the Philadelphia Gymnasium about two weeks ago, broke a tendon in his left leg, which accident has caused him to confine himself to the house for some time.

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EARLY CLOSING IN AUSTRALIA.

According to the Australia Journal of Pharmacy, early closing in that Dominion is accomplished by governmental regulation, upon the petition of the majority of the shop-keepers, under a recently passed amendment to the Factories and Shops Act. The first regulation in regard to this matter was issued on the sixth day of January last, and is as follows:

"The Executive Council Chamber Melbourne.

"Under the powers conferred by the Factories and Shops Acts, His Excellency the Governor of the State of Victoria, by and with the advice of the Executive Council thereof, upon a petition certified by the acting municipal clerk of the municipal district of the Shire of Mildura, as signed by a majority of all shop-keepers (exclusive of hawkers and pedlers) of the particular class or kind to be affected, doth hereby make the following regulation, that is to say:

"All Chemists' shops (being shops of a class or kind mentioned in the Fourth *Schedule to the Factories and Shops Act*

1912, No. 2386) in the township of Mildura within the municipal district of the Shire of Mildura, shall be closed in each and every week during the whole of each year on the evenings of Sunday, Monday, Tuesday, Wednesday and Thursday from the hour of eight o'clock, on the evening of Friday from the hour of ten o'clock, and on the afternoon of Saturday from the hour of one o'clock, and allowing such shops to re-open on the evening of Saturday in each and every week from the hour of seven o'clock until the hour of eight o'clock.

"And the Honorable Sir Alexander James Peacock, His Majesty's Minister of Labour for the State of Victoria, shall give the necessary directions herein accordingly."

F. W. MABBOTT,
Clerk of the Executive Council.

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THE EIGHTH ANNUAL MEETING OF THE AMERICAN DRUGGISTS' FIRE INSURANCE COMPANY.

At the eighth annual meeting of The A. D. F. I. Co., held at Cincinnati, February 9-10, the following directors were elected:

Chas. H. Avery, Chicago, Ill., L. G. Heinritz, Holyoke, Mass., James H. Beal, Urbana, Ill., W. S. Elkins, Jr., Atlanta, Ga., Wm. C. Anderson, Brooklyn, N. Y., G. O. Young, Buckhannon, W. Va., A. O. Zwick, Cincinnati, O., Lewis C. Hopp, Cleveland, O., Simon N. Jones, Louisville, Ky., John D. Muir, Grand Rapids, Mich., Walter Rothwell, Hatboro, Pa., Geo. B. Kauffman, Columbus, O., M. S. Kahn, Baltimore, Md., E. B. Heimstreet, Palmyra, Wis., and Frank H. Freericks, Cincinnati, O.

The Board of Directors elected the following officers:

Chas. H. Avery, President; L. G. Heinritz, Vice-President; Frank H. Freericks, Secretary and General Counsel; Geo. B. Kauffman, Treasurer; Executive Committee: Chas. H. Avery, L. G. Heinritz, Walter Rothwell, A. O. Zwick, J. H. Beal, Geo. B. Kauffman and Frank H. Freericks.

The year 1914 was the most successful one in the history of the Company. During the year it wrote $14,785,282 of insurance at a premium of $150,827.66. The gross savings in premiums made and retained by its policyholders during the year on the business written amounted to $50,275.88. The gross savings in premiums which the Company has made for its policyholders since it commenced business amount to $213,035.64. During the year the company had 160 fire losses amounting to a total of $41,120.64. The total expenses for the year, inclusive of adjustment expense, amounted to $48,649.90. The Re-Insurance Reserve or Unearned Premiums of the Company on the business of the year amount to $65,568.50.

The Board of Directors declared a 9% dividend, payable on March 1, 1915.

On January 1, 1915, the total assets of the Company were $385,350.99, of which $343,564.30 was represented by Government, County and Municipal bonds.

The total liabilities of the Company, not including Re-Insurance Reserve, were $9,528.75. After deducting the Re-Insurance Reserve of $65,568.50, and the value of furniture of $716.40, the net surplus of the company as to its policyholders amounts to $309,537.34.

The Board of Directors ordered that the Company, which is now doing business in 31 states, should during the year enter four or five additional states. It gave serious consideration to a possible further reduction in premium rate to the policyholders, and ordered a complete survey of the Company's business with a view of taking action at the next Annual Meeting. The Company, which now has entered the ninth year of its career, looks forward to a most substantial increase in its business for the year and feels reasonably certain that in its tenth year the annual business of the Company will be in excess of $20,000,000, at a premium in excess of $200,000. A saving to its policyholders in one year of over $50,000 in their premium outlays proves the splendid service rendered to the drug trade of the country by those who organized and capitalized The American Druggists' Fire Insurance Company.

NECROLOGY.

THOMAS KNOEBEL.

Thomas Knoebel, of East St. Louis, Ill. was born at Belleville, Ill. on August 30, 1859 and died at his home in East St. Louis on January 3, 1915.

Mr. Knoebel received his early education in the public schools of his native city, graduating from the high school in 1876. He then accepted a position with Adolph Finke, of East St. Louis, and entered the St. Louis College of Pharmacy, from which he was graduated in 1880. In 1881, he

bought the store of his employer and later moved his place of business to 209 Collinsville avenue, East St. Louis, where he remained until his demise.

He became a member of the American Pharmaceutical Association in 1892 and took a deep interest in its work. He was one time president of the Illinois Pharmaceutical Association and an earnest worker in the promotion of state pharmaceutical legislation in Illinois. He was particularly active in matters of public education, being president of the local Board of Education. He took a deep interest in the education of the poor and lowly, and through his efforts a consolidation of the various school districts of his city was effected, so that all classes, poor and rich alike, were given the equal educational advantages. He was prominent in civic life, being selected at one time as a candidate for the mayoralty of his city.

Aside from his public and business life, there was another phase of his character that endeared him to all who knew him—his kindness to the poor; and his advice to those in distress, and his even temperament, were the complement of the life of his inner home, that was a model in its best and truest sense.

On March 29, 1883, he was married to Miss Minnie D. Eslaman, who with his son, Percy T. survives him.

As expressed by his intimate friend, Hon. W. J. Perrin, "He belonged to no particular organization and was of no particular creed, but better than all he had the highest religion—that of humanity. The highest hope—that of ultimate perfection. His creed was optimism and his rule was patience and perseverance. As one who knew him for forty years I render every tribute willingly, but I know of no tribute higher or loftier than to say that he was in every sense faithful to his trust."

J. W. E.

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Joseph Alexander Velsor, President of the firm of Peek and Velsor, New York City died on February 15 at his home 105 McDonough St., Brooklyn, of oedema of the lungs, at the age of eighty-five years.

Mr. Velsor was a cousin of the celebrated poet Walt Whitman. Funeral services were held at his residence, on Wednesday, February 17.

Mr. Velsor was a member of the A. Ph. A. and of the National Wholesale Druggist's Association and held membership in several social clubs of Brooklyn and New York.

He was also a life-member of the Y. M. C. A. of Brooklyn and a Free Mason. He leaves behind him to mourn his loss, a wife and two children, Joseph H. Velsor and Mrs. Frederick Smith.

Letters to the Editor

Editor The Journal of the American Pharmaceutical Association, Columbus, Ohio.

February, 24, 1915.

Dear Sir: It may be of interest to you to know that the Executive Committee of the National Association of Boards of Pharmacy will meet at Washington, D. C., (Hotel Raleigh), March 16-20.

Now, as Bert Taylor of the Chicago Tribune might say, notice of "Committee Meetings" is "Zero," in news. However, I believe the coming meeting has more than the usual significance. Big things are growing out of the work being carried on by the National Association of Boards of Pharmacy. Especially the work covered by the Advisory Examination Committee of the Association. Not the least of these is the tendency for the Schools and Boards to "get together" on the scope and character of courses of studies and examinations.

A joint session of the Boards and the Conference of Pharmaceutical Faculties has been listed on the programs of the respective conventions, each year. It has usually been a "tailender," wholly informal in character, without any definite object or program, and as is usual in such cases, without much result.

Now it is proposed to change all this. At the Detroit Convention last year, committees were appointed by both the Conference of Pharmaceutical Faculties and the Boards These committees to work jointly and to arrange a definite and vigorous program in order that Boards and Colleges might derive maximum benefits from the meeting. Representatives of these committees will meet jointly with the Executive Committee of the N. A. B. P. at its Washington meeting to arrange for definite work to be taken up by the joint meeting of the Conference of Pharmaceutical Faculties and Boards, to be held during the coming convention at San Francisco, in August. It is proposed to make this meeting something more than a

"tailender." The real "Meat in the Nut" and object of this proposed work is the bringing about a closer relationship between Colleges of Pharmacy and Boards of Pharmacy. Especially with a view of finding out and correcting if possible, the seeming lack in many instances, of proper balance between what is taught and examined on, in the schools; and the scope covered by Boards of Pharmacy examinations.

The Conference of Pharmaceutical Faculties' Committees will be represented at the Washington Conference by Professors, Julius A. Koch of the Pittsburgh College of Pharmacy; Henry Kraemer of the Philadelphia College of Pharmacy; and Henry P. Hynson of the Department of Pharmacy, University of Maryland.

Those representing the Committees for the National Association of Boards of Pharmacy will be Mr. Wm. S. Flint of Massachusetts; W. P. Porterfield of North Dakota; and H. C. Christensen of Illinois.

The members of the Executive Committee of the N. A. B. P. are as follows: L. C. Burton, Chairman, Stroud, Oklahoma; L. C. Lewis, Tuskegee, Alabama; W. P. Porterfield, Fargo, North Dakota; T. A. Miller, (Pres. N. A. B. P.) Richmond, Virginia, Ex-Officio; H. C. Christensen (Secy. N. A. B. P.) Chicago, Illinois, Ex-Officio.

A number of other Association members and educators are expected to be present.

There is at present, a great deal of interest in this movement for closer association between Boards of Pharmacy members and School Faculties. Both bodies are looking forward to this as the next big advance in Pharmaceutical Education and Examination Methods.

Inasmuch as all of us—outside of the immediate officers, depend upon the Journals of Pharmacy for information marking the progress of our profession, any space you can spare to announce these meetings, the objects sought and progress being made, will, I am sure, be greatly appreciated, not only by the officers and members of the respective Associations but also by the profession in general.

Thanking you in advance, I am,

Very truly yours,

H. C. CHRISTENSEN,
Secretary N. A. B. P.

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Editor The Journal of the American Pharmaceutical Association, Columbus, Ohio.

February 24, 1915.

Dear Sir: As Secretary of the National Association of Boards of Pharmacy, I have recently received a number of communications from Boards of Pharmacy members, and others, in different states with reference to the advisability of introducing "bills," in state legislatures fashioned along the lines of the "Harrison Act."

There seems to be an impression in a number of instances, that in order to have this law effective in a state, the state must have a law to correspond.

I am attaching hereto a copy of a letter which I have used—with some slight variations, in making reply to these communications. You are at liberty to use it as you may see fit—as an open letter from me as Secretary of the N. A. B. P., quote from, or as a basis for an article with reference to this matter, or not at all.

It would however seem, since I am receiving enquiries, that it might be of advantage to publish some information along this line.

I am,

Very truly yours,
H. C. CHRISTENSEN,
Secretary N. A. B. P.

COPY OF LETTER.

February 15, 1915.

Referring to your letter of recent date relative to the advisability of introducing into your legislature, which is now in session, a bill fashioned along the lines of the recently passed Harrison Narcotic Law," I beg to submit to you certain facts and opinions which will, I believe, on consideration, point out the inadvisability of introducing such a bill.

First: In theory, the Harrison Narcotic Law, if I understand it, aims to restrict and control the distribution of certain "habit forming" drugs, in order that they may not be illegitimately used. The enforcement of this law is placed in the hands of the Internal Revenue Department of the Federal Government, which certainly has all the "machinery" for enforcing the law and certainly has the reputation of enforcing the law without fear, favor or relaxation.

Second: This law differs, markedly in its application, from the "Pure Food and Drugs Act," which extended only to Imports and Interstate shipments. The Harrison Narcotic Law extends to every state, city, village, town, cross-roads store, rural route, etc., within the United States and its possessions. The pure food and drugs act, does not apply to the manufacture and sale of food and drug products within the state, and hence the states were left to enact and enforce laws for the control of their "internal" affairs. The Harrison Law, however reaches within the state and applies to all venders in certain drugs, regardless of state, city, village or county lines.

Third: Now, a state law along the lines of the Harrison law would mean paralleling the work all along. It would mean, inspectors, expenses, taxes, etc., for state work already being done by the Federal Government.

Fourth: It would also mean the keeping of double sets of records by druggists—those for the Federal Government and those for the state, with endless confusion and annoyances.

Fifth: When, again, in the matter of punishing infraction of the law, the violator would be doubly liable—to the state and to the Federal Government, and inasmuch as the Federal Authorities would be the most

likely to prosecute first, I doubt very much if one would—especially in the case of a jury trial, get a second conviction on the part of the state. Your law would therefore, in effect, become a dead letter.

As a pharmacist, I am opposed to legislation of any kind that will harass the members of a profession, already burdened with laws and regulations, when said legislation serves no good purpose either for the pharmacist, or the public he serves.

As a board member, for several years, I am convinced that it is the duty of Boards of Pharmacy, to be as alert in protecting the interests of the pharmacists of their respective states, as they would be in protecting the great mass of people of the state in which they serve. I am opposed to the enactment of laws of any kind that become dead-letters on our statute books, either because they are unnecessary, or because they lack the support of public opinion, which is essential to the enforcement of any law.

A state law could, to be sure, be made more stringent than the Federal law, but that would be of doubtful advantage. I believe the Harrison Narcotic Law, properly enforced will control thoroughly and efficiently the distribution of habit forming drugs, and if that is done, the end sought is attained.

I hope the Boards of Pharmacy and others interested in pharmacy legislation in the different states will realize the seriousness of a duplication of this law and lend every effort to prevent such mistakes being made.

Very truly yours,
H. C. CHRISTENSEN,
Secretary N. A. B. P.

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Chicago, Feb. 21, 1915.

My Dear Sir: I used to wonder why Dr. Whelpley always remarked "thank you" when I sent in my five. I now know. It is my turn now to thank you for the contents of the February issue. Just what a druggist likes to read.

Very truly yours,
JOHN STUCHLIK.

3859 W. 26th St., Cor. Springfield Ave., Chicago, Ill.

College and Society

ILLINOIS PHARMACEUTICAL ASSOCIATION.

Owing to some questions that arose regarding the hotel facilities, the Centralia Commercial Club has withdrawn the invitation extended to the Illinois Pharmaceutical Association to hold its next convention in Centralia. The vote of the Executive Committee of the Illinois Pharmaceutical Association is now announced. The selection of Centralia as the place of meeting has been reconsidered and by a large majority the Executive Committee has selected Springfield. The annual convention, therefore, will be held at Springfield, June 15 to 17, 1915.

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UNIVERSITY OF ILLINOIS SCHOOL OF PHARMACY.

The classes of the University of Illinois School of Pharmacy have organized and elected officers as follows:

Senior class—President, H. L. Eberly; Vice-President, S. B. Trippett; Secretary, L. A. Gorham; Treasurer, Ralph Hawthorne; Sergeant-at-Arms, H. A. Nelson.

Junior class—President, Ed. Baldwin; Vice-President, Frank Graham; Secretary, D. B. Real; Treasurer, Tom Copeland; Sergeant-at-Arms, Ernest Denson; Historian, Warde Imes.

The Phi, Chi and Alumni Chapters of the Kappa Psi Fraternity gave a dance at the new Fort Dearborn Hotel, Chicago, February 5, 1915. The affair was very much enjoyed by a large number of fraternity members and their ladies including many of the Alumni.

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THE COLLEGE OF PHARMACY OF THE STATE UNIVERSITY OF IOWA.

Prof. R. A. Kuever addressed the Iowa Association of Ice Cream and Butter Makers on the subject of Vanilla at their recent convention at Des Moines. He delivered a similar address before the Nebraska Association at Omaha, Nebraska.

Dean Teeters, chairman of the Athletic Board represented Iowa University at the annual meeting of the governing board of the Iowa state conference of inter-collegiate athletics which was held in Des Moines, January 29.

Professor Jagadis Chander Bose of the University of Calcutta, India, one of the most distinguished plant-physiologists of the world, accepted the invitation of the

University to give an address on his discoveries before the students and faculty on February 9.

Professor Bose has lectured before the Royal Institute of London, at the Universities of Oxford and Cambridge, of Paris, Berlin, and Vienna.

The English Government has conferred upon Dr. Bose the decoration of the Companionships of the Star of India and the Indian Empire and sent him on a scientific mission to Europe just a few months before the outbreak of war.

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COLLEGE OF JERSEY CITY.

ENTERTAINMENT AND BALL OF THE JUNIOR FRATERNITY.

The Junior Class of the Department of Pharmacy of the College of Jersey City, this year is not only large in number but also great in activity. They have even formed a new fraternity, having the mystic letters P. I. D., which means

"PROSPICE IUVENTUS DILIGENTIA"

"LOOK FORWARD O YOUTH WITH DILIGENCE."

The Annual Entertainment and Ball of the Junior Class was held on Friday evening, February 12th (Lincoln's birthday) at Majestic Hall, 125 E. 125th street, New York City. The entertainment was well arranged and included besides many other attractions a one-act play and also an American Indian Tableau.

The ball included the latest dances and over two hundred couples took part in the march, which was led by the Dean, Dr. Joseph Koppel. The following other members of the faculty were also present: Prof. Otto Raubenheimer, Prof. Jacob Gutman, Prof. Joseph Koffler, Prof. Adolph Schnitter, Prof. Felix von Oefele, Dr. Victor E. Levine, Dr. Enrico Samarelli, and Dr. Alfred B. Guarnier.

The Senior Class as well as the Post-Graduate Class were well represented, and quite a number of students from other colleges were in attendance. Short speeches were delivered by Prof. Joseph Koppel, of the Faculty, Charles M. De Gaetani, President of the Junior Class, Louis Schultz, Vice-President of the Senior Class, and Edward Sher, President of the Post-Graduate Class.

The music was excellent and was furnished by the orchestra of Prof. Vincent Norman Riggio. The officers of the Junior Class and quite especially Charles M. De Gaetani, President, J. Kaplin, Vice-President, Miss J. Schillaci, Secretary, D. Rosenfeld, Treasurer and H. J. Ellen, Sergeant-at-Arms, deserve credit for their active work.

This entertainment and ball given by the Junior Class was a great success, and proves that the College of Pharmacy of Jersey City is not only making headway along educational lines, but also socially. It is expected that another entertainment including a banquet will be given during May, before graduation.

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MINNESOTA STATE PHARMACEUTICAL ASSOCIATION.

The thirty-first annual meeting of this association was held on February 9-10-11, at St. Paul. About seven hundred people attended the convention and the meeting was a very successful and enjoyable one.

President Max E. Menzel presided at the opening session on Tuesday morning and the gathering was welcomed to the city by Commissioner Henry McCall. Professor F. J. Wulling responded to the welcoming address, and the meeting was then addressed by Governor Hammond, whose complete address will be found in another column.

Mr. Donald Robertson made fitting response to the Governor and then President Menzel delivered his address.

He referred to the effects upon the trade of the European War and to the war tax laid by the government to supply the deficiency in the customs revenue; endorsed the Stevens bill; and gave qualified approval to the Harrison Anti-Narcotic legislation.

He referred to the evils of dispensing by physicians, to substitution by druggists, and suggested the adoption of a legal prescription blank to eliminate the reasons urged by physicians for dispensing their own medicines.

He criticized counter-prescribing and suggested remedial measures for raising the standard of pharmacy.

He condemned the extensive advertising in a fraudulent and misleading manner of proprietary medicines and suggested that the

journals of the trade should be critical of the advertising they accept.

He suggested an appropriation by the Association of $25 for the relief of the Belgian pharmacists.

He praised the work of the Secretary, Dr. E. L. Newcomb, and thanked the other officers of the Association for their support.

The Treasurer's report showed a very satisfactory financial exhibit for the Association.

Secretary E. L. Newcomb made a business-like report of the duties and activities of his office. He reported the membership of the Association as 669.

The Scientific papers presented to the Scientific Section comprised the following: "The Twelve Schuessler Tissue Remedies," by Dr. Wulling; "Some Ash Determinations of Digitalis," by Mr. Haynes and Dr. Newcomb; "Drug Adulteration," by Prof. Gustav Bachman; and Dr. Newcomb presented three papers entitled "Microscopic Characteristics of some Powdered Unofficial Drugs," "Drugs produced in the Medicinal Plant Garden of the M. C. P. during 1914," and "Ash Contents of some Unofficial Drugs."

Mr. F. A. Upsher Smith read a paper upon "Compound Syrup of Hypophosphites," which paper was accompanied by samples made by suggested new formulas.

Mr. E. V. Clark gave a lecture illustrated by stereopticon views on "Hog Cholera Serum."

The following officers were elected for the ensuing year:

President, Richard J. Messing; First Vice-President, John Danek; Second Vice President, Miss Marie Piesinger; Third Vice-Fresident, Donald Robertson; Secretary, Dr. E. L. Newcomb; Treasurer, L. J. Aberwald.

The meeting was addressed by Internal Revenue Collector Lynch and by Secretary Potts of the N. A. R. D. both of whom spoke upon the recent National legislation treating at length upon the Harrison Bill, by C. H. Turner, on "Drug Store Accounts" and by Mr. Hilbert on "The Soda Fountain."

The entertainments were the reception and ball, excursions and theatre-party for the ladies and the annual banquet which was attended by about five hundred people.

Proceedings of the Local Branches

BALTIMORE.

The February meeting of the Baltimore Branch of the American Pharmaceutical Association was held Wednesday evening, February the seventeenth, in the Hynson, Westcott and Company assembly room at Charles and Franklin Streets, with President E. W. Hodson in the Chair.

The minutes of the January meeting were read and approved.

As an outcome of their reading, it was ascertained that the Internal Revenue Department considers it advisable for physicians to not have their registry number printed on their prescription blanks but to write it each time, for if numbered blanks fall into the possession of unscrupulous persons they might, by using them, obtain supplies of narcotics until the fraud was discovered.

A copy of a proposed letter to the Press in regard to the Harrison act was submitted by the Secretary and was referred to the executive committee for final action.

An election of three chairmen of standing committees, postponed from the previous meeting, was held and resulted as follows:

Chairman of Committee on Membership, Charles Morgan.
Chairman of Committee on Professional Relations, John B. Thomas.
Chairman of Committee on Education and Legislation, Louis Schulze.

The regular program for the evening was: "The Preservation of Galenicals" by Dr. Charles C. Neal, who has given a great deal of attention to this somewhat neglected but important part of the "Day's Work," and "Helpful Hints in Dispensing and Manufacturing" by Charles C. Meyer and Otto Muelhause, practical dispensing pharmacists, both of whom have given and are giving considerable time and much talent to developing, improving and perfecting new dispensing methods.

Mr. Neal, in reading his paper, considered particularly tinctures, fluid extracts, solid extracts and powdered extracts and during its reading and discussion, the following facts and lessons were learned.

Any deterioration, in about one-third of

the pharmacopœia preparations, is due to carelessness in preservation or storage.

A preliminary sedimentation, rather than precipitation, begins in the majority of tinctures and fluid extracts in from a few hours to several weeks after they have been made. After this usually inert sediment has ceased falling and has been, as it usually is, filtered out, the finished preparation should be practically stable, if kept in proper containers, securely stoppered, and at a uniformly moderate temperature and protected from light and heat.

Preparations high in alcohol, as a rule, keep much better than those of low proof and aqueous or weakly alcoholic ones are much more prone to deterioration.

Containers should also be practically full. A pint of fluid extract or tincture in a gallon bottle is exposed to the action of the seven and a half pints of air in the bottle and oxidation is likely to go on and even evaporation of volatile constituents may occur, resulting in the loss of valuable components and a lowering of alcoholic strength.

Loose stoppers are responsible for the same conditions and the practice of recorking a bottle with a stopper which has been pierced by a cork screw or of loosely corking it with a good cork always causes loss of something or a change of some kind, if the preparation is kept for any length of time.

Evaporation of a fluid extract to a solid extract or to even a hard dry extract has occurred as a result of this carelessness. Just the opposite effect is produced in deliquescent salts and a liquid may result.

Powdered extracts should not be poured out of their containers but should be removed with a spatula. Any of the powder left on the inside of the neck and in contact with the cork, will invariably become a solid extract, especially in damp climates, the cork sticks and is generally broken in attempting to remove it.

Solid extracts should be taken from the center of the jar and any to be replaced should be dropped in the same place and not wiped from the spatula on the side as hardening of that left there, follows.

"No sane man or official will hold a pharmacist for an allowable deterioration in the strength of Spirit of Nitrous Ether, Tincture of Iodine, Fowler's Solution, or similar preparations" was the answer of a state official to a query, but it was pointed out that care must be exercised in making everything especially in making Spirit of Nitrous Ether in small quantities and storing it in small amber bottles.

It was also brought out, that, in these and similar cases, the new Pharmacopœia proposed to allow for a slight deficiency or increase in strength.

The general use of tap water by some pharmacists was condemned and its replacement in all preparations by distilled water was advocated.

Solution of magnesium citrate made with recently distilled water or with boiled and cooled stock distilled water has kept for months and need not be freshly prepared. A case was cited, an account of which appears in the 1911 Proceedings, of a bottle of this solution which showed no signs of decomposition, excepting darkening, after fifteen years.

Mr. Meyer suggested a unique way in which to prepare this solution.

Drop the oil of lemon calculated from the required quantity of syrup of citric acid, on the magnesium carbonate—(which must be of U. S. P. quality and not the kind marked for "Technical use only")—place this into all of the distilled water necessary for the finished product, stir well, place the citric acid crystals in a muslin bag and suspend just below the surface of the liquid. Solution will take place rapidly and when completed, add sugar, calculated from the required quantity of syrup of citric acid. Filter, bottle, charge, cap with a crown cork and label. He has kept it for eight months and it may keep longer as he feels that if it keeps that long it should keep practically indefinitely.

Stock solutions of the salts of the halogens or of the alkaloids can be kept for a long time or until used and show no signs of fungus growth if made with boiled and cooled distilled water.

Mr. Meyer brought along a wonderful assortment of apparatus, most of which is in regular use about his pharmacy.

His explanations of the uses to which they were put and his exposition of his subject was instructive, edifying and entertaining.

Among the various and sundry objects in his exhibit were:

A percolator ring with three movable pins which could be adjusted by thumb screws to

take anything from a small funnel to a large percolator.

An absorbent cotton holder made from a slide covered wood box with a hole in the bottom out of which the cotton protruded. This was kept in an elevated position and small tufts could be pulled away and used for filtering, *et cetera*, while the rest of the cotton was kept clean and protected from dust.

A box arranged similarly but with a slit in the bottom out of which the end of a roll of bandage gauze protruded. Any length desired for straining or other purposes could be pulled out and cut off with scissors.

A spring holder for rubber stamps for holding graduates bottom up and allowing them to drain without the top coming in contact with a dusty shelf.

An egg beater for quickly making emulsions.

A small sauer kraut cutter for shaping up small pieces of castile soap, utilizing the shavings for soap liniment.

A small tin machine oil can for filling capsules with oil.

A hand power capping machine for capping magnesium citrate solution bottles with crown caps, costing six dollars.

An irrigating apparatus can with tube attached was used for filling liquids into bottles.

Numbers of other ingenious things were shown and Mr. Meyer was looked upon as a near wizard.

Mr. Muelhause contributed a paper on different prescriptions and brought out that cocaine hydrochloride was incompatible with borax in solutions that contained no glycerin. Spray solutions of some of the proprietary mild alkaline antiseptic liquids which formerly formed precipitates when cocaine hydrochloride was added, do not form them now. This bears out what has long been contended, that the manufacturers of this class of medicines are likely to change their formulas from time to time and the dispensing pharmacist may get different reactions as a result.

The subject of the salting out of small quantities of essential oils in solutions of bromides or other salts in aromatic waters was brought out by a prescription which contained 8 minims of spirit of anise in a two ounce chloroform water solution of strontium bromide and resorcinol.

No method of mixing this was devised which produced a clear solution, except to add alcohol or additional water.

Replacing a part of the aromatic water in such solutions, sometimes by even a small quantity of distilled water and in others by a larger quantity, produced clear solutions.

A prescription calling for ammonium carbonate, syrup of iron iodide and mucilage of acacia caused all sorts of trouble. The best procedure under the circumstances seemed to be to use tragacanth and dissolve the carbonate in half the required quantity of water and mix the syrup with the other half, mix these two solutions and in the mixture dissolve the tragacanth.

In all cases of a precipitate occurring when two soluble substances produce it, the rule to follow is as above and to dilute the solutions of each as much as the formula will permit and then mix them.

In considering the swelling up of mass capsule prescriptions of Antikamnia and citrate caffeine and the prevention of it by using an equivalent amount of caffeine alkaloid, it was brought out that the tablets of Antikamnia and Codeine, which, heretofore, contained 18 grains codeine sulphate to the ounce, now contain only 1/8 grain to the ounce.

WM J. LOWRY, JR., Secretary.

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CHICAGO.

The Chicago Branch of the American Pharmaceutical Association met February 16th. The topic of the evening being "The Pharmacy Preparatory High School Course."

This course has been arranged by Mr. W. M. Roberts, District Superintendent of schools of Chicago, a committee of the Executive Board of the Chicago Retail Druggists Association consisting of Messrs. Louis J. Pelikan, E. P. Seibert and A. C. Caldwell, Dean C. W. Patterson of Northwestern University School of Pharmacy, Dean W. B. Day of the University of Illinois, and three Chicago high school principals.

The pharmacy preparatory course has been officially adopted by the Board of Education upon the recommendation of Ella Flagg Young and is now being offered at the Chicago high schools to young men and women who have completed an elementary course equivalent to that of the

Chicago elementary schools and who desire to enter the profession of pharmacy. The course presents the following unusual features: First, students will be in attendance at school only in the morning, 8:30 to 12:30 P. M. i. e. for four study periods; second, the studies will include, in addition to English, Latin and algebra, others especially preparatory to the college of pharmacy courses, such as botany, chemistry, physics, physiology and simple accounting; third, one credit will be given each year for *one whole year* of properly supervised and tested work as an apprentice in pharmacy. The completion of the work in school will yield twelve credits and the four credits of apprentice work will provide sixteen credits, one credit short of the number required for graduation. One additional study period per day in any one of the four years would furnish this missing credit and qualify for graduation from the high school.

The two schools of pharmacy in Chicago have raised their requirements for admission to fifteen units, the Northwestern University School of Pharmacy now requiring fifteen units and the University of Illinois School of Pharmacy will require the same in 1916.

Students preparing for pharmacy who may be fortunately situated as to be able to attend school for five or six class periods each day may earn in the school the full seventeen credits required for graduation or at least the fifteen required for admission to the schools of pharmacy. It is estimated that about 500 boys now employed in drug stores in Chicago may avail themselves of this course if the druggists will give their apprentices a chance. The plan has already been favorably received by many pharmacists of the city.

One very important feature of the course is the standardization and supervision of the apprentice work. At present an apprenticeship committee has been appointed by the Chicago Retail Druggists Association to which is added a member of the Board of Education which shall supervise the apprentice work. An amendment to the Illinois Pharmacy law requiring graduation from a recognized school or college of pharmacy as a prerequisite to the examinations for registered pharmacy is to be presented to the state legislature now in session and its passage will be urged by the Illinois Pharmaceutical Association, the Illinois Board of Pharmacy and other influential organizations of pharmacists.

In the discussion of the evening Messrs. Roberts, I. M. Light, W. B. Day, C. W. Patterson, J. H. Wells, Thos. Potts, L. J. Mrazek, L. J. Pelikan, Hugh Craig, Wm. Gray, E. N. Gathercoal and others participated. Mr. Light stated that in his opinion most of the Chicago druggists were in favor of the pre-requisite requirement yet the graduation from high school requirement for entrance to schools of pharmacy was frightening many druggists for fear that there would soon be a scarcity of clerks.

E. N. GATHERCOAL, Secretary.

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DETROIT.

The third meeting of the Branch was held at the Wayne County Medical Building on February 19th.

Mr. Seltzer, in a report for the Committee on Legislation stated that some amendments to the present Michigan Pharmacy Law had been drawn up by the Committee, aided by Mr. Woodruff, and some of these would be presented to the Legislature at its present sitting. Modifications of the narcotic law were especially desirable, and are to be submitted for action.

Prof. W. H. Allen then called attention to the confusion existing with regard to a reliable antidote to mercuric chloride poisoning, and presented the following resolution as a motion, which was seconded by Mr. Mann, and then adopted by vote:

"In view of the fact that poisoning by mercuric chloride has increased, and the antidotes at present published do not appear to be always reliable, it is desirable that an investigation be made by the American Pharmaceutical Association to decide upon better antidotes and to publish the same so that pharmacists may have such instructions to render "first aids," pending the arrival of a physician."

Mr. Allen also exhibited a sponge, originally weighing 4 ounces, and the "mud" weighing 2½ ounces which he had washed therefrom, and which had undoubtedly been present as a filler, the sponge having been sold by weight. He objected to the reflection on the retail druggist which such conditions bring. The subject was discussed briefly by Messrs. Rohnert, Mann, and others who tended to the view that the selling of sponges is no longer an attractive

issue for pharmacists, many of whom are now discouraging it.

Mr. W. L. Scoville then presented "Three Interesting Incompatibilities" with illustrations, the first being the change of quinine to quinotoxin through the influence of organic acids, and pointing out an important incompatibility between quinine and aspirin. The second incompatibility is the decomposition of organic acids by ferric salts, induced by light, the acids being reduced to water and carbon dioxide and causing an effervescence which may burst a bottle. The third, was a combination of boric and tartaric acids in tablets which proved to be sufficiently active chemically to liberate hydrochloric acid from ammonium chloride.

Mr. C. F. Mann gave an informal talk, full of sound sense, upon the "Relationship between Clerk and Employer," pointing out the needs for mutual confidence, mutual forbearance and reasonable expectations on each side. Mr. Mann called attention to a number of details in carrying out such a policy. Mr. Weaver discussed the subject briefly, stating that he believed that both clerk and employer profited by great expectations on each side rather than by expecting little.

The Chairman announced that the next meeting of the Branch on March 19 would be addressed by Professor Edmonds of the University of Michigan on the subject of "Twilight Sleep."

WILBUR L. SCOVILLE, Secretary.

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NASHVILLE.

On January 20th the Nashville Branch A. Ph. A. met in Bloomstein's Hall with the new President, E. F. Trollinger, in the chair. On account of the illness of Secretary White, Dr. J. O. Burge was appointed Secretary *pro tem.* After the approval of the minutes President Trollinger appointed the following committees for the ensuing year: Legislation—C. C. Young, Chairman, J. B. Sand, W. R. White, S. C. Davis. Membership—M. E. Hutton, E. A. Ruddiman, J. O. Burge, L. S. Pully, D. J. Kuhn, A. J. Martin, J. Y. Waldrum. Publicity—W. R. White, J. O. Burge, J. R. McDaniels. Abstracts—R. L. Eves, F. L. Smith, Max Bloomstein, J. G. Brummitt, A. M. Webb. U. S. P. and N. F.—E. A. Ruddiman, J. M. Rogoff, Ira B. Clark, R. L. Eves, W. R. White, J. O. Burge. Program—Dr. J. M. Rogoff, chairman, J. B. Sand, R. L. Thompson. Entertainment—S. C. Davis, A. Nickel, G. H. King, J. R. Mansfield, E. Kemper. A communication from J. W. England, offering suggestions for the coöperation of the local Branches was read and referred to the Program Committee. Dr. Rogoff, the new chairman of the Program Committee, made an interesting talk and made some suggestions on the work of that committee. He said if the retail men would attend the meetings they could be made of great value to them, almost equivalent to a post-graduate course. He suggested that all persons interested in Pharmacy in any way be invited to attend the meetings as associate members. He thought the membership committee should invite all students of Pharmacy, Chemistry and Medicine attending the schools in the city, practising physicians and others in any way interested in Pharmacy. Mr. J. E. Justice, member of the Tennessee Board of Pharmacy, said the Board, which was then in session examining a class of 51 applicants, had delegated him to represent them at this meeting. He said they were much interested in the work of the Branch and would like any suggestions from the Branch for the betterment of Pharmacy. Dr. E. A. Ruddiman then moved that the Board be requested to increase the requirements for registration from a grammar school requirement to the equivalent of one year in a high school to take effect January 1st, 1916. Upon the adoption of the motion, Mr. Justice was requested to bring the motion before the Board at the present session.

About one hundred and fifty druggists from the city and its environs attended the meeting of the Branch on February 17.

President Trollinger presided and the meeting was addressed by Dr. Lucius P. Brown, Inspector for the State Board of Health, and Mr. Cecil Fraser, of the U. S. Internal Revenue office, on the subject of the Harrison Bill.

After their addresses the following questions were asked of them, all of which were answered in the negative:

Can a prescription be filled by telephone order? Can a "dope fiend" register and purchase from a wholesaler? Is an eye-water an external remedy? Is a physician limited in the amount he prescribes? Are

state and city laws made void by the National law? Will holders of "permits to sell drugs" in rural districts be permitted to sell narcotics if they register with the Internal Revenue Collector?

Concerning habitual users of such drugs, Doctor Brown stated that there were 2370 persons holding permits to use such drugs in the state and he believed that number was not more than half of those habitually using them.

A committee consisting of C. C. Young, E. A. Ruddiman, D. J. Kuhn, Ira B. Clark, and C. S. Martin was then appointed to confer with Dr. Brown in drafting a new state law to conform with the federal law.

Dr. J. M. Rogoff read a paper entitled "Professional Side Lines" in which he discussed the opportunities of pharmacists for work along lines of physiological analysis, the examination of sputa, urine, etc., and urged them to activity in this direction.

Dr. Burge took advantage of the presence of many druggists to place before them the advantages of membership in A. Ph. A. and invited all to join in its work.

W. R. WHITE, Secretary.

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PHILADELPHIA.

The regular monthly meeting of the Philadelphia Branch of the American Pharmaceutical Association was held Tuesday evening, February 9th, at the Philadelphia College of Pharmacy.

President E. Fullerton Cook called the meeting to order at 8:30 p. m. The minutes of the last meeting were read and approved.

The President appointed Mr. Joseph W. England, Prof. Henry Kraemer and Mr. Franklin M. Apple as a committee on nominations. The committee was instructed to submit nominations to be balloted upon for the officers of the local Branch at the March meeting.

Mr. Dell W. Youngken was unanimously elected to membership in the Association.

The programme was then taken up and Mr. Richard Cuthbert, Jr., presented an interesting paper on "The Professional Ideals of Pharmacy." In the absence of Dr. F. E. Stewart, his paper on "Professional Pharmacy from the Viewpoint of the Commercial Laboratory," was read by the Secretary.

Prof. Julius W. Sturmer presented "The Current Review of Pharmaceutical Journals."

The papers submitted were discussed by Messrs. W. G. Nebig, Franklin M. Apple and Prof. Joseph P. Remington.

Not a little of the success of the meeting was due to the interesting display—One display consisted of a large number of preparations made in accordance with the new U. S. P. and N. F.; the other an "Exhibit of Filled Prescriptions," by Walter S. Froelich was of unusual excellence.

A vote of thanks was given to the contributors of the programme after which the meeting adjourned. Respectfully,

J. ED. BREWER, Secretary.

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ST. LOUIS.

The St. Louis Branch held its regular monthly meeting in the St. Louis College of Pharmacy, February 19. Leo R. Suppan, B. Sc., presented a paper, illustrated with slides, on "The Monastic Dispensaries of the Middle Ages—A Chapter in the History of Pharmacy." Dr. Whelpley, Prof. Francis Hemm, Dr. Gustav Rehfeld, briefly discussed some phases of the Harrison Anti-Narcotic Law.

J. W. MACKELDEN, Actg. Secretary.

Changes of Address

All changes of address of members should be sent to the General Secretary promptly.

The Association will not be responsible for non-delivery of the Annual Volume or Year Book, or of the JOURNAL unless notice of change of address is received before shipment or mailing.

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SOHRBECK, G. H.,
From 3rd Av. and 16th St., Moline, Ill.
To 5th Av. and 16th St., Moline, Ill.

STEVENSON, A. E.,
From 1539 Vermont St., Lawrence, Kans.
To 1312 Mass. St., Lawrence, Kans.

STURMER, J. W.,
From 17th and Cherry St., Philadelphia, Pa.
To 1715 Cherry St., Philadelphia, Pa.

WHITTLESEY, H. H.,
From 240 E. Centre St., Pocatello, Idaho.
To East Side Pharmacist, Pocatello, Idaho.

WILLIAMS, L. S.,
From St. Paul and 24th St., Baltimore, Md.
To 1300 N. Caroline St., In care Morgan & Willard, Baltimore, Md.

JOHNSON, R. V.,
From Hosp., Columbus Barracks, Columbus, Ohio.
To Ambulance Co. No. 8, U. S. A., Galveston, Texas.

HERMAN, CHRISTOPHER,
From Ft. Shafter, Honolulu, Hawaii Islands.
To Presidio of Monterey, Cal.

HARPER, J. E.,
From Clearwater, Neb.
To Spencer, Neb.

SIZEMORE, C. R.,
From 3024 Easton Av., St. Louis, Mo.
To 3874 Page Blvd., St. Louis, Mo.

BALMERT, C. A.,
From care Cirto Chem. Co., Maywood, N. J.
To care Emerson Drug Co., Lombard St., Baltimore, Md.

LEET, R. A.,
From Box 492 Oakland, Cal.
To Box 477, Oakland, Cal.

LOW MARGEREY D.,
From St. Francis Hosp., San Francisco, Cal.
To Mrs. Harry Low, Apt. 402-1625 Polk St., San Francisco, Cal.

WHITTLE, W. A.,
From 308 W. Lombard St., Baltimore, Md.
To 802 Gosuch Av., Baltimore, Md.

HICKS, G. W.,
From Hosp. Camp McGrath, Prov. Batangas, P. I.
To Fort Ethan Allen, Vermont.

KISHON, A. M.,
From Post Hosp. F. D. A. Russell, Wyo.
To Residence Unknown.

O'GORMAN, T. V.,
From 2009 Vallejo St., San Francisco, Cal.
To Box 608, San Jose, Cal.

REMIREZ, FRANCISCO,
From 498 Jesus del Monte, Havana, Cuba.
To Residence Unknown.

REITER, HARRY LEO,
From Camp Ward Cheny, Cavite, P. I.
To Fort Levett, Me.

WEBB, EVANS HALL,
From 1421 9th St., No. Nashville, Tenn.
To Residence Unknown.

TOCCO, ORAZIO,
From 95 Chrystie St., Brooklyn, N. Y.
To 81-83 Chrystie St., Brooklyn, N. Y.

SMITH, C. E.,
From 640 Bedford Av., Brooklyn, N. Y.
To 5 Beekman St., New York, N. Y.

KUTCHBAUCH, J. F.,
From 1707 Blue Rock St., Cincinnati, O.
To 1510 Scott St., Covington, Ky.

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From 933 Champlain St., Detroit, Mich.
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CORREA, J. F., JR.,
From 47 St. Botolph St., Boston, Mass.
To 426 Newbury St., Boston, Mass.

BOLENBAUGH, ALBERT,
From Dept. of Pharm., Univ. College of Medicine, Richmond, Va.
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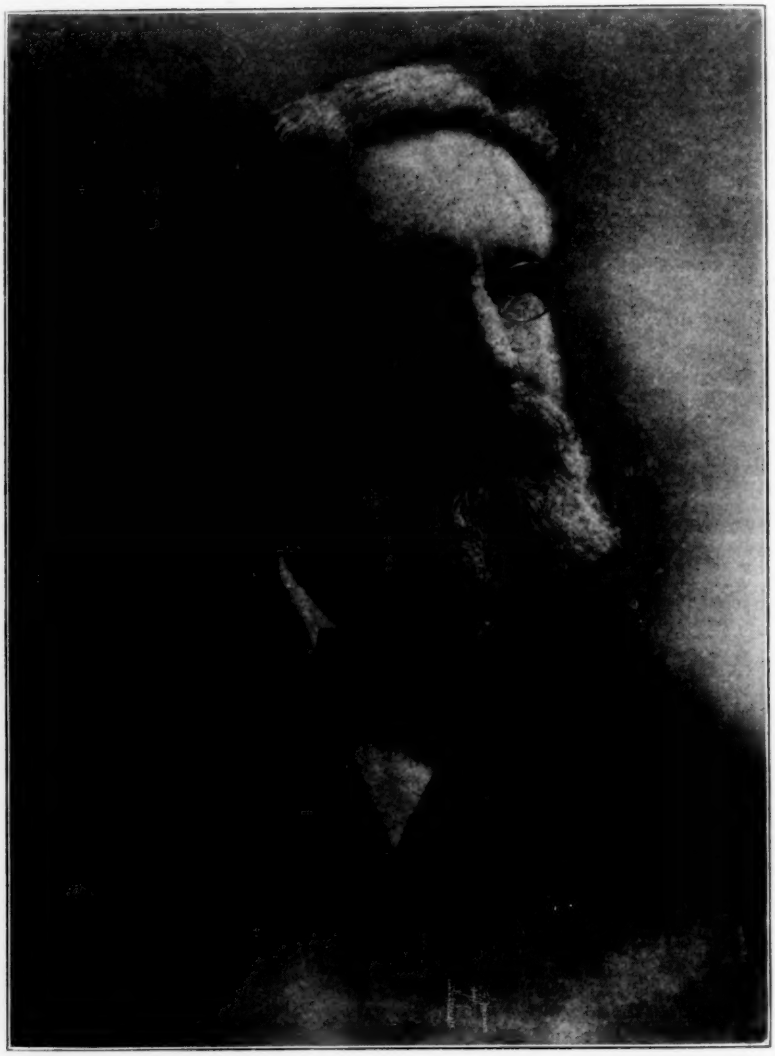
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